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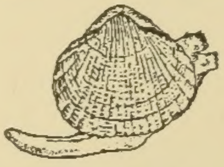

A review of the enigmatic genus *Canalispira* Jousseaume, 1875 (Gastropoda : Cystiscidae) with the description of three new species from the western Atlantic

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KEYWORDS. *Canalispira*, Cystiscidae, Mangroves, western Atlantic, Honduras, Belize.

ABSTRACT. A literature review of the genus, and an inventory of currently recognised species of the genus *Canalispira* Jousseaume, 1875 is presented. Photographs of the animal of *Canalispira* and its radula confirm its correct placement in the Cystiscidae, and morphologic comparisons are made between western Atlantic and other worldwide species. Three new species of *Canalispira* are described: *C. phantasia* n. sp. and *C. ornata* n. sp. from northern Honduras, and *C. fluctuata* n. sp. from Belize and northern Honduras.
Osvaldoginella Espinosa & Ortéa, 1997 is considered as a new synonym.

INTRODUCTION

Historic review of the genus *Canalispira*

The confusion in the literature regarding the taxonomic status of the genus *Canalispira* has, since its inception by Jousseaume (1875), been extensive and prolonged. This has been caused mainly by the lack of recent references in the popular conchological media, the misnaming of specimens in museum collections, and the general paucity of other specimens available for study. The group has, therefore, remained obscure. A brief chronology of the taxonomic history of this enigmatic genus helps to illustrate this fact.

In his 1875 monograph, Jousseaume established the new genus *Canalispira* as one of thirteen genera in the Marginellidae, on the basis of the canaliculated suture of the type species, *C. olivellaeformis* Jousseaume, 1875 (Figs 30, 31), and with great foresight drew comparisons with the Olividae, which he had also observed to bear this character. Subsequent marginellid general reviews such as Redfield (1870), Weinkauff (1878-1879) and Tryon (1882-1883) deliberately avoided attempts at taxonomic division in the Marginellidae. However, Weinkauff did propose a generic classification of sorts, including *Canalispira* in his 'division 2', which comprised those genera lacking a 'basal sinus'.

Early in the 20th Century, several Indian Ocean species were described under *Marginella* s.l. by E. A. Smith (1903), Preston (1906 & 1915), and Melvill (1912). Tomlin (1917) listed alphabetically all known *Marginella* and assigned them to appropriate genera. However, even he failed to correctly place several species in *Canalispira*. Laseron (1957) named thirty new genera, including *Baroginella*, which was later considered by Coovert (1995) to be a junior synonym of *Canalispira*.

The gradual accumulation of data on radula and animal characters allowed Coan (1965) to attempt a new classification, proposing three major divisions in the family Marginellidae: the subfamilies Marginellinae Fleming, 1828, Cystiscinae Stimpson, 1865 and Marginelloninae Coan, 1965, placing *Canalispira* in the Marginellinae.

The lack of any published information about the anatomy of the animal, combined with a shell morphology superficially resembling that of the genera *Volvarina* and *Prunum*, ensured that the historic placement of *Canalispira* in the Marginellidae persisted. As recently as 1991, a new Caribbean species, *Canalispira hoffi* (Moolenbeek & Faber, 1991), was described as a *Prunum*, with the authors themselves admitting that it did not quite fit its placement therein. In another case, Lipe & Sunderland (1991) presented a new *Canalispira* species from Florida, as a *Volvarina* species. This species still remains undescribed, but closely resembles *C. aurea* García, 2006, a species from the Bahía de Campeche, in the lower Gulf of Mexico. To compound the problem, the genus *Osvaldoginella* Espinosa & Ortéa, 1997, clearly synonymous with *Canalispira*, was erected for a single deep water Cuban species.

The presence of *Canalispira* in the fauna of southern Africa was recognised by Kilburn (1990), who reviewed the South African *Canalispira* and named a new species, *C. umuhlwa* Kilburn, 1990. Later coverage of the South African *Canalispira* species was provided by Lussi & Smith (1998) in a review of the South African Cystiscidae, but by then the taxonomic situation had changed for the better with the publication of the important work of Coovert & Coovert (1995), who had divided marginelliform gastropods into two main families: Marginellidae Fleming, 1828 and Cystiscidae Stimpson, 1865. Crucially they placed *Canalispira* in the Cystiscidae, based upon a sketch of the animal of a Western Australian species, and on shell morphology and radula characters, which they had established as being diagnostic. They made the observation that the channelling of the suture is a species-level character in this genus, and appealed for more study of the living animals. They also demonstrated important ancestral relationships between the Olividae and the Cystiscidae, thereby confirming what Jousseaume himself had suspected over a century earlier, and making the genus even more interesting to study as a special link between the two families.

Diagnosis of *Canalispira*

The species assigned to *Canalispira* have tiny to small-sized, robust, porcelainous shells (approx. L = 2.5- 10.0 mm). The shape is cylindrical-biconic to narrowly ob-ovate, usually with a very weak shoulder. The colour is commonly opaque white, creamy or golden-tan, but some western Atlantic species, including the ones described herein, have light to dark brown irregular, wavy axial markings, or zig-zag markings, some forming a tented pattern. The channel at the suture (Figs 26-28, 30, 31) can be deep, weakly recessed or callused over. The spire is medium to tall, and the aperture narrow posteriorly but widening anteriorly. The lip is thickened, especially anteriorly, either smooth and not lirate within aperture, or denticulate and lirate. The external varix is absent. There is no siphonal notch, except in the west African species *Gibberula cucullata* Gofas & Fernandez, 1998, discussed below. However, there is always a deep, narrow posterior notch (Figs 23, 26, 27, 30), even in species with no channelled suture. The columella bears 3-6 plications and parietal lirae, and the internal whorls are reduced in thickness by resorption.

Geographic and Bathymetric Distribution

The genus has a worldwide distribution and has strongholds in the Gulf of Mexico, the northern Caribbean and the western Indian Ocean. A further possible member of the genus has been found in the Gulf of Guinea, in west Africa. The Indian Ocean harbours a number of species from the east coast of South Africa, the Gulf of Oman, and Western Australia, and several species are present in northeastern Australia. As yet, species of *Canalispira* have not been found in most of the Pacific, including tropical west America. Species are found from intertidal depths to 540 m, and it is evident that, in the western Atlantic at least, endemism is high.

Species assigned to *Canalispira*

Coovert & Coovert (1995) noted that there were thirteen species of *Canalispira*: one from South Australia, seven from the Indo-Pacific, three from the western Atlantic, and two from South Africa, without being more specific.
We consider the taxa that can be assigned to *Canalispira* as follows. These are in chronological order, with their original generic designation retained:

Described species

Canalispira olivellaeformis, Jousseaume 1875. Type species. Locality unknown (Figs 30, 31).
Marginella fallax E. Smith, 1903 from False Bay to Ramsgate, Natal.
Marginella shacklefordi Preston, 1915 from Sri Lanka (*nom. nov.* for *M. eburnea*, Preston, 1906), (Fig. 26).
Marginella replicata Melvill, 1912 from the Gulf of Oman (Figs 27, 28)
Canalispira minor Dall, 1927 from Georgia / northeast Florida.
Baroginella infirma Laseron, 1957 from Northern Queensland.
Baroginella attentia Laseron, 1957 from Northwestern Australia and Queensland.
Canalispira umuhlwa Kilburn, 1990 from Natal.
Prunum hoffi Moolenbeek & Faber, 1991 from Saba, Netherlands Antilles.
Osvaldoginella gomezi Espinosa & Ortéa, 1997 from Cuba.
Canalispira aurea García, 2006 from Bahía de Campeche, Gulf of Mexico.

New species described in this paper

Canalispira phantasia n. sp. from Roatán (Bay Islands), Honduras.
Canalispira ornata n. sp. from Roatán and Guanaja (Bay Islands), Honduras.
Canalispira fluctuata n. sp. from Belize and Roatán (Bay Islands), Honduras.

Doubtful assignment

Baroginella volunta Laseron, 1957 from Queensland.

Tentative assignment

Gibberula cucullata Gofas & Fernandez, 1988 from São Tomé, Gulf of Guinea (see comments below).

Undescribed species

Marginella sp. no. 29 in Lipe 1991, pl. 17 no. 4 and pl. 18 no. 32, Two Peoples Bay, Albany, Western Australia.
Marginella sp. no. 80 in Lipe 1991, pl. 7, fig 4, screened off Tryall, Jamaica, 80 ft.
Marginella sp. no. 83 in Lipe 1991, pl. 7, figs 8, 9, dredged in 50 Fathoms off Florida = *Volvarina* sp. in Lipe & Sunderland, 1991.

Habitats of *Canalispira*

Canalispira appear to be very widespread and diverse in the Bay of Honduras. They can be encountered on nearly every dive when collecting in settled muddy rubble at depths from 2 m down to approximately 15 m. Populations have also been encountered in the mud, amongst the roots of mangroves, where they form an important part of the gastropod fauna. They do not appear to favour flat sandy substrates in shallow areas where wave action occurs.

Our first sample of *Canalispira*, however, were found in dredgings performed in May 2006 from s/y Marina Em, in 56 m, off northeastern Honduras (off Cayos Vivarillos, dredged 56m, 16°04.9N 83°56.1W). They were initially catalogued by us as *Volvarina.* All eight shells were dead, and most were faded, and whilst transportation of shells to this depth cannot be entirely ruled out, it is more likely that live specimens are found here, as it is a small location on a large, flat, off-shore bank with little opportunity for transportation to have taken place. The shells were of poor quality and unsuitable for descriptive purposes. It is possible that they are conspecific with *C. fluctuata* n. sp., and a sample, labelled *C. cf. C. fluctuata* has therefore been lodged as voucher material in BMNH.

Live *C. ornata* n. sp. was subsequently collected in the northeastern lagoon of Guanaja, Bay Islands, Honduras, in the muddy sand under piles of dead coral rubble inside vital reef. From animal studies of these specimens it became clear that the shells previously dredged off Cayos Vivarillos were *Canalispira* and not *Volvarina.*

In June 2006, live specimens of *C. fluctuata* n. sp. were discovered at several locations in Belize, and also in Roatán, Bay Islands, Honduras. The discovery of the stunningly patterned *C. phantasia* n. sp. in a mangrove habitat in Roatán followed a short time later. The mangrove area is often avoided, presumably because collecting shells here is dirty work. It is, however, a place rich in beautiful, darkly coloured species, and the biotope is thus worthy of description; Along the edge of the mangroves at the waterline, there is often a steep bank ranging from 0.2 m to 1 m in height. At the base of this is the mud of the bay and this gently slopes away into deeper water. There is generally little algal coverage immediately beneath the mangroves as this area is shaded from the sun, but the weed and other algal growth starts outside the edge of the leaf canopy. It is in the shaded area below the mangrove roots and in the soft mud at the foot of the bank where *C. phantasia* n. sp. are to be found. It is interesting to note that another of our new species, *C. fluctuata* n. sp., was found 300 metres from the colony of *C. phantasia* n. sp. albeit in an entirely different habitat. In addition, mangroves at Mud Hole Swash, Roatán, (16° 21.4'N 86° 31.0'W), close to the type locality of *C. ornata* n. sp., were checked but results were negative for *C. phantasia* n. sp.

General anatomical observations

The anatomy of *Canalispira* is essentially that of a type 4 animal (Coovert & Coovert, 1995) with a modification in the form of greatly reduced anterior lobes on the head, and the presence of parapodia – 'wing-like' lateral extensions of the foot which curl upwards to surround the sides of the anterior half of the shell and project forwards to form two lobes. So extensive are these that in *C. phantasia* n. sp. the yellowish foot has been observed to partially envelop the shell in a mantle-like fashion. During movement, the animal always holds these foot extensions as described, and it may be that this anatomical feature is put to use when the animal buries itself in the substrate. Such behaviour is commonly observed in the animals of the related family Olividae, which use movements of their expansive foot to soften the substrate to facilitate rapid burial.

Gofas & Fernandez (1988) recorded lateral edge curling of the foot in *Gibberula gruveli* Bavay in Dautzenberg, 1913 but this simple edge curling is not as dramatic as that seen in *Canalispira.* On the other hand, *Gibberula cucullata* Gofas & Fernandez, 1988 from São Tomé, was described as having strongly developed 'parapodia' and a highly modified head. The authors illustrated the animal (plate 2, fig. b), which shows a remarkable anatomical resemblance to all of our new species in that the split head has no anterior lobes and the foot is translucent with small, blurred, opaque-white spots, and completely unlike other sympatrically occurring *Gibberula* species, which are spotted in red, green, yellow and brown. The shell of *Gibberula cucullata* is similar in size to the tiny western Atlantic *Canalispira* species, and the authors mention the deep channel at the posterior insertion of the lip. However, unlike typical *Canalispira*, the shell appears to have an anterior notch, and strong labial denticles run the whole length of the lip. The shell is not thick and porcelainous, is coloured uniformly tan, lacks axial markings, and its profile is closer to that of *Gibberula* than any other *Canalispira.* Indeed, Coovert & Coovert (1995) provisionally considered it to be *Gibberula.* Without live animals for study to hand, we cannot make any definitive statement as to its generic status. However, there is a distinct possibility that this species may be the single known species from west Africa belonging to *Canalispira.*

At the suture, an impressed or callused-over channel is found encircling the spire of *Canalispira*. Tursch & Greifeneder (2001) described, in some detail, what appears to be an analogous structure in the Olividae and Olivellidae and called it the 'filament channel' since it is occupied by a long filamentous organ. They demonstrated that in these families the channel has no relationship with the suture, and is found remote from it. Our examinations of deeply channelled Indo-Pacific *Canalispira* show that, unlike in the olives, it is closely associated with the suture. It was also noted that in all of the Atlantic species known to date, the channel is modified by being callused over. We have not observed a soft tissue filament in these Atlantic *Canalispira*, and in our opinion the channelled suture may simply be a product of the way the spire of the shell is formed.

Materials and methods

Specimens were collected by the use of dredging, or substrate suction during snorkelling and SCUBA diving, followed by screening the sediment of large particles, and then allowing time for the animals to crawl out.

Digital images of the shells were made using a Kodak PSLR/n camera mounted on an Olympus SZX12 microscope. A radula was extracted from a single juvenile specimen of *C. ornata* n. sp. The shell was crushed and the radula was cleaned in a 10% KOH solution before mounting in a gelatine and glycerine medium. Images of the radula were taken using the same camera mounted on an Olympus CX41 microscope.

Abbreviations

MNHN: Muséum national d'Histoire naturelle, Paris, France.
BMNH: Natural History Museum, London, England.
AWC: Andrew Wakefield Collection.
TMC: Tony McCleery Collection.
ad.: adult specimen.
juv.: juvenile specimen.
lv.: live taken specimen.
dd.: dead dredged shell.
L: Length of shell.
W: maximum width of shell.

SYSTEMATICS

Family **CYSTISCIDAE** Stimpson, 1865
Subfamily **PERSICULINAE** Coovert & Coovert, 1995
Genus ***Canalispira*** Jousseaume, 1875
Type species *C. olivellaeformis* Jousseaume 1875
= *Baroginella* Laseron, 1957
Type species *B. infirma* Laseron, 1957
= *Osvaldoginella* Espinosa & Ortéa, 1997 (new synonymy)
Type species *O. gomezi* Espinosa & Ortéa, 1997

***Canalispira phantasia* n. sp.**

Figs 1-6, 19

Type material. Northern Honduras (Bay Islands), Roatán Island, Fantasy Island lagoon, French Harbour area, 16° 21.6'N 86° 26.4'W, 1m in mud at edge of mangroves, 1 ad. lv., holotype (3.38 x 1.64 mm), (Figs 1-3), Reg. no. BMNH 20060787.
1 ad. lv., paratype 1 (3.18 x 1.57 mm), (Figs 4-6), Reg. no. BMNH 20060788 ; 1 ad. lv., paratype 2 (2.95 x 1.47 mm), (Fig. 32), AWC; 1 ad. lv., paratype 3 (3.38 x 1.58 mm), AWC; 1 ad. lv., paratype 4 (3.05 x 1.49 mm), AWC; 1 ad. lv., paratype 5 (3.20 x 1.62 mm), TMC; 1 ad. lv., paratype 6 (3.14 x 1.57 mm), TMC; 1 ad. lv., paratype 7 (2.79 x 1.40 mm), TMC.

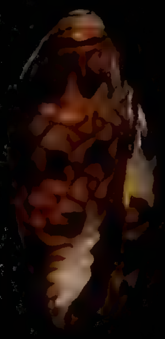
Other material examined. Approximately 50 ad., lv., from the type locality.

Type locality. Fantasy Island lagoon, French Harbour area, south-central Roatán Island, northern Honduras (Bay Islands).

Figures 1-22

1-6. *Canalispira phantasia* n. sp. Fantasy Island lagoon mangroves, Roatán, Honduras, 1 m;
1-3. holotype, 3.38 x 1.64 mm, BMNH 20060787; **4-6.** paratype 1, 3.18 x 1.57 mm, BMNH 20060788.
7-12. *Canalispira fluctuata* n. sp. **7-9.** Pelican Cays, Belize, 15 m, holotype, 2.99 x 1.49 mm, BMNH 20060789;
10-12. Fantasy Island lagoon reef, Roatán, Honduras, 5 m, paratype 1, 3.16 x 1.63 mm, BMNH 20060790.
13-18. *Canalispira ornata* n. sp. **13-15.** Mud Hole Swash, Roatán, Honduras, 2 m, holotype, 2.81 x 1.40 mm, BMNH 20060792. **16-18.** Northeast Lagoon, Guanaja, Honduras, 2 m. Voucher specimen, 2.6 x 1.26 mm, BMNH 20060794.

19-22. *Canalispira* live animals.
19. *C. phantasia* n. sp., paratype 2, head detail; **20.** *C. ornata* n. sp. head detail; **21.** *C. ornata* n. sp., holotype; **22.** *C. ornata* n. sp., unpigmented specimen.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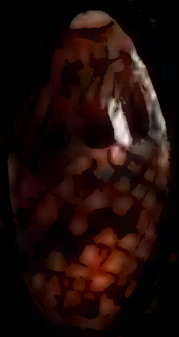
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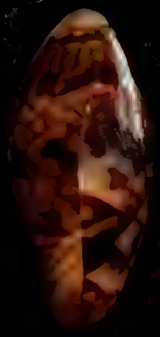
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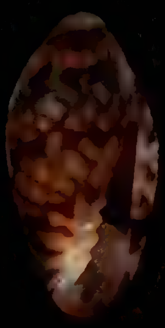
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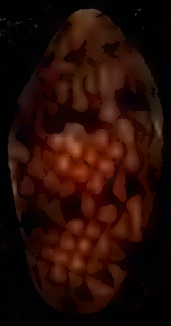
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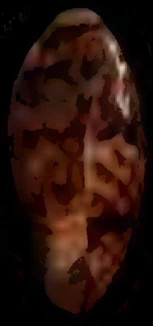
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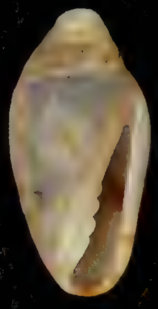
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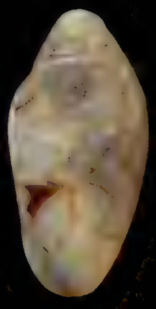
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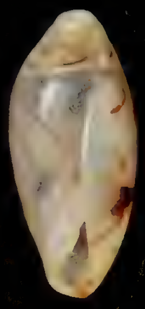
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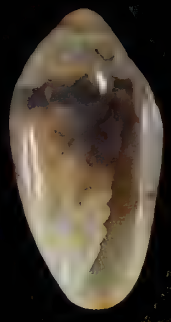
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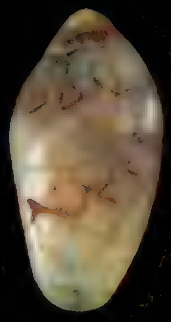
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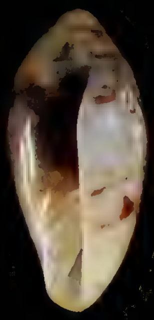
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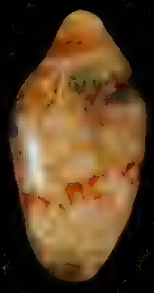
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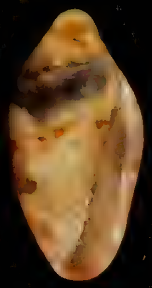
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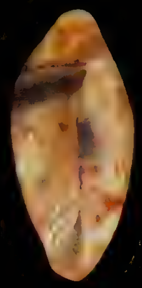
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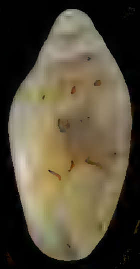
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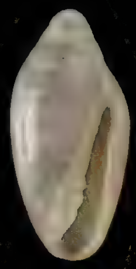
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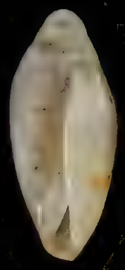
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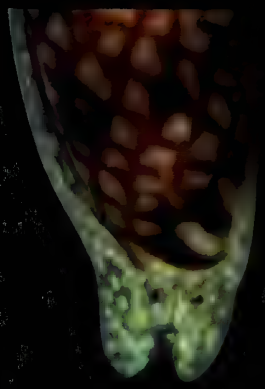
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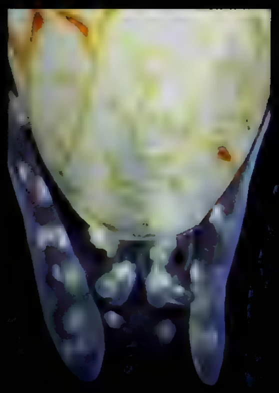
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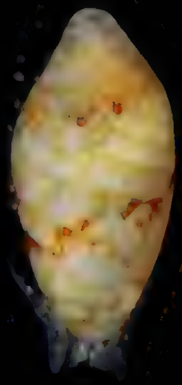
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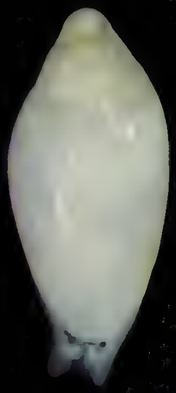
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Description. Shell tiny (L: 2.79 to 3.38 mm), cylindrical-biconic (W:L ratio 47 to 50 %); surface smooth, glossy. Spire slightly convex, of medium height, of 3½ whorls including the moderately wide, milky white protoconch. Shoulder very weak; suture indistinct. Colour creamy yellow, with regular to slightly irregular dark brown, densely tented pattern; pattern arranged in such a way as to produce a reticulated effect throughout the surface of the shell; three spiral rows of darker markings at shoulder mid-body and anterior end. Suture marked with fine brown line; line extending onto protoconch. Aperture moderately wide anteriorly, narrowing posteriorly, ending in a narrow, sharply defined posterior notch. Labial denticles absent. External labial varix absent; lip thickened, narrowing to a sharp edge posteriorly. Parietal wall concave posteriorly, convex in region of the four columella plications. Parietal callus wash running full length of aperture, with weak, shallow fasciolar edge. Columella with four rounded, oblique, closely spaced plications occupying just less than half of apertural length; first plication strong, increasing in width anteriorly, sweeping around the base of the shell to join lip; second and third plications strong, emergent; fourth plication weaker, confined to aperture.
Animal: Modified type 4 animal (Fig. 19). Foot narrow, dimensionally similar to shell, rarely extending beyond it, extending anteriorly to form parapodia; parapodia curling up around the sides of the anterior half of the shell, extending forward as bilateral lobes. Foot translucent yellow, with clusters of 4 to 8 tiny, opaque, blurred white spots, more numerous anteriorly. Eyes black, situated centrally within each half of the split head, distal to the base of short, blunt tentacles which are generally held in a vertical position. Head lobes anterior to tentacles greatly reduced in size.
Radula unknown (not extracted).

Distribution. Found at the type locality only.

Habitat. *C. phantasia* n. sp. has so far been found only in the mud at the edge of mangroves.

Remarks. The overall slightly larger size, reticulated pattern, and specialized habitat sets this beautiful species apart from its congeners. Other comparative comments are presented in Table 1.

Etymology. From the Greek word *phantasia*: fantasy. Alluding to the type locality of Fantasy Island.

Canalispira fluctuata n. sp.

Figs 7-12, 23, 25

Type material. Belize, Pelican Cays, grid ref., 1 ad. lv., in 15 m, holotype (2.99 x 1.49 mm), (Figs 7-9), Reg. no. BMNH 20060789 ; Fantasy lagoon reef, Roatán, northern Honduras, Bay Islands (16° 21.4'N 86° 26.3'W), 1 ad. lv., in 5-15 m, paratype 1 (3.16 x 1.63 mm), (Figs 10-12), Reg. no. BMNH 20060790; 2 ad lv., paratypes 2, 3 (2.96 x 1.51 mm, 2.67 x 1.43 mm), AWC; Long Cocas Cay, Belize, 1 ad. lv., paratype 4 (2.38 x 1.19 mm), AWC; Long Cocas Cay, Belize, 1 ad. lv., paratype 5 (2.40 x 1.40 mm), TMC.

Other material examined. Belize: Pelican Cays(16° 39.5'N 88° 11.3'W), 10 ad. lv. and 4 juv. lv.; Long Cocas Cay(16° 29.6'N 88° 12.8'W), 1 ad. lv. and 1 juv. lv.
Honduras: Fantasy Island lagoon reef, Roatán Island, northern Honduras (Bay Islands), approx. 60 ad. lv., and 10 juv. lv. ; Off Cayos Vivarillos (16° 04.9'N 83° 56.1'W), 5 ad. dd. and 3 juv. dd., dredged in 56 m, (Size range approx. 2.38 – 3.16 mm in length. W:L of 50-54%).
One ad. dd. (2.72 x 1.38 mm), lodged as voucher material, Reg. no. BMNH 20060791, as *C. cf. C. fluctuata*.

Type locality. South-central Belize, Pelican Cays.

Description. Shell tiny (L = 2.38 – 3.1 mm), cylindrical-biconic (W:L ratio 50 – 54%); surface smooth, glossy. Spire of medium height, of 3½ whorls including the moderately wide, milky white protoconch. Shoulder very weak; suture indistinct. Colour creamy-white, with irregular to regular brown wavy axial pattern, or zig-zag pattern; pattern extending onto spire and anterior labial margin; darker brown blotch showing adjacent to labial margin, at mid-body, and on shoulder. Aperture moderately wide anteriorly, narrowing posteriorly, ending in a narrow, sharply defined posterior notch. Labial denticles absent. External labial varix absent, lip thickened, narrowing to a sharp edge posteriorly. Parietal wall concave posteriorly, convex in region of the four columella plications. Parietal callus wash running full length of aperture, with distinct, shallow fasciolar edge. Columella with four rounded, oblique plications occupying just over half of apertural length; first plication strong, increasing in width anteriorly, sweeping around the base of the shell to join lip; second and third plications strong, emergent; fourth plication weaker and confined to aperture.
Animal: Modified type 4 animal. Foot narrow, dimensionally similar to shell, rarely extending beyond it; extending anteriorly to form parapodia; parapodia curling up around the sides of the anterior half of the shell, extending forwards as bilateral lobes. Foot translucent, with clusters of 4-8 tiny opaque, blurred white spots, more numerous anteriorly. Eyes black, situated centrally within each half of the split head, distal to the base of short tentacles which are generally held in a vertical position. Head lobes anterior to tentacles greatly reduced in size.
Radula unknown (not extracted).

Distribution. Belize; Long Cocas and Pelican Cays. Northern Honduras; Roatán Island, and tentatively recorded off Cayos Vivarillos (16° 04.9'N 83° 56.1'W).

Habitat. 5 to 15 m; on slopes with muddy rubble.

Remarks. *C. fluctuata* n. sp. is most likely to be confused with *C. ornata* n. sp. Their differences are presented in Table 1.

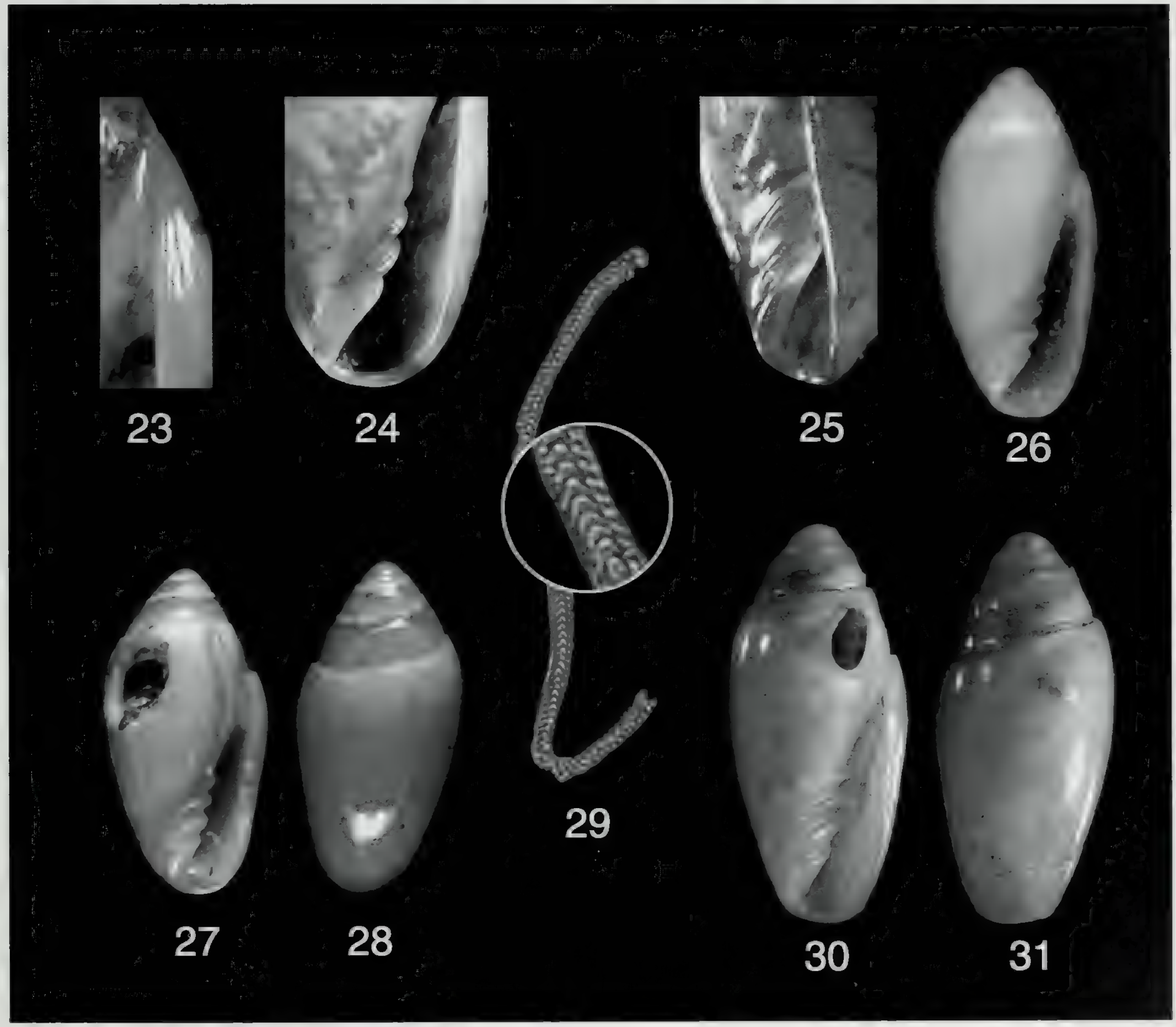
Etymology. From the Latin *fluctuata* (= wavy).

Named for the design of the pattern in the surface of the shell.

Canalispira ornata n. sp.

Figs 13-18, 20-22, 24

Type material. Northern Honduras (Bay Islands), Roatán Island, Mud Hole Swash (16° 21.7'N 86° 31.3'W), 2m in muddy rubble, holotype (2.81 x 1.40 mm), (Figs 13-15), Reg. no. BMNH 20060792 ; 1 ad. lv., paratype 1 (2.81 x 1.38 mm), Reg. no. BMNH 20060793 ; 1 ad. lv., paratype 2 (2.81 x 1.38mm), AWC.



Figures. 23-31

23. *C. fluctuata* n. sp. posterior lip showing deep narrow posterior notch; **24.** *C. ornata* n. sp. columella plications; **25.** *C. fluctuata* n. sp. columella placations; **26.** *C. eburnea* Preston, 1906, syntype, BMNH; **27-28.** *C. replicata* Melvill, 1912. Gulf of Oman, syntype, L=4.5mm, BMNH Ref. no. 1912.9.17.1/4-5; **29.** Radula of *C. ornata* n. sp; **30-31.** *C. olivellaeformis* Jousseaume, 1875. Lectotype, L=4.2 mm, locality unknown, MNHN.

Type locality. Mud Hole Swash, Roatán Island, Bay Islands, northern Honduras, 16° 21.7'N 86° 31.3'W.

Other material examined. Guanaja, northern Honduras (Bay Islands), North East Lagoon, 16° 28.5'N 85° 49.4'W, in 2m, 1 ad. lv. (2.60 x 1.26 mm), (Figs 16-18), and 1 ad. lv. (2.88 x 1.39 mm), both deposited as voucher specimens, Reg. no. BMNH 20060794. Also 4 ad. lv. from the same locality as above, and 10 ad. lv. from reef in centre of lagoon 300 m distant, in 3 to 15 m.

Description. Shell tiny (L = 2.6– 3.05 mm), cylindrical-biconic (W:L ratio 48 %); surface smooth, glossy. Spire moderately tall, straight to slightly concave, of 3½ whorls including the moderately wide, milky white protoconch. Shoulder weak; suture weakly distinct. Colour creamy white, with very fine, irregular, brown axially-oriented, zig-zag pattern, or tented pattern; pattern extending onto spire and anterior labial margin; dark brown markings showing in two distinct rows: above shoulder and at mid-body. Aperture moderately wide anteriorly, narrowing posteriorly ending in a narrow, sharply defined posterior notch. Labial denticles absent. External labial varix absent; lip thickened, narrowing to a sharp edge posteriorly. Parietal wall concave posteriorly, convex in region of the four columella plications. Parietal callus wash running full length of aperture, with distinct shallow fasciolar edge. Columella with four rounded, oblique, closely spaced plications; plications occupying just less than half of apertural length; first plication strong, increasing in width anteriorly, sweeping round the base of the shell to join lip; second and third plications strong, converging at their distal ends; fourth plication weaker, confined to aperture.

Animal: Modified type 4 animal. Foot narrow, dimensionally similar to shell, rarely extending beyond it; extending anteriorly to form parapodia; parapodia curling up around the sides of the anterior half of the shell, extending forward as bilateral pedal lobes. Foot translucent, with clusters of 4-8 tiny, opaque, blurred white spots; spots more numerous anteriorly. Eyes black, situated centrally within each half of the split head, distal to the base of short, blunt tentacles which are generally held in a vertical position. Head lobes anterior to tentacles greatly reduced in size.

Radula: Radula of juv. from Guanaja. (L = 2.20mm); Cystiscid type 3, long (113 narrow arched plates, measuring 4.84 µm from centre to centre of consecutive plates), narrow (13.9 µm wide), and each bearing 7 pointed cusps, with the central cusp being the strongest (Fig. 29).

Distribution. This species has been found at two locations in the Bay Islands, northern Honduras; Mud Hole Swash, Roatán Island (16° 21.7'N 86° 31.3'W), and in the Northeast lagoon, Guanaja, (16° 28.5'N 85°49.4'W).

Habitat. In muddy sand, under piles of dead coral rubble. Inside living reef, in 2 to 5 m. (At the Roatán locality it was found in 2 m inside vital reef. At the Guanaja locality it was also found there, but in addition at 3 to 5 m in the centre of the lagoon. In all these places it was found in muddy sand under piles of dead coral rubble.)

Remarks. *C. ornata* n. sp. is most likely to be confused with *C. fluctuata* n. sp. Their differences are given in Table 1.

The intensity of the colour pattern is variable in this species, as demonstrated by Figs 13-18. One of the Roatán specimens of *C. ornata* n. sp. found was white, completely devoid of pattern (Fig. 22). As this specimen had black eyes, it cannot be considered a true albino, and it is the only example of mutation noticed in the genus so far.

Etymology. *ornata* – decorated (Latin). Named for its intricate pattern.

DISCUSSION

The differences between our three new species are presented in Table 1.

Regional species which require comparison with our three new species are *Canalispira minor* Dall, 1927 from Georgia / northeast Florida, *Prunum hoffi* Moolenbeek & Faber, 1991 from Saba, Netherlands Antilles, *Osvaldoginella gomezi* Espinosa & Ortéa, 1997 from Cuba, *Marginella* sp. no's 29, 80 & 83 in Lipe (1991), and *Canalispira aurea* García, 2006 from Bahía de Campeche, Gulf of Mexico.

The most similar of these species is *Osvaldoginella gomezi* Espinosa & Ortéa, 1997 (Cossignani, 2006: 175). Its shell is more darkly marked, is more cylindric and is restricted to 25-55 metres off Cienfuegos, North Havana Province, Cuba.

Prunum hoffi Moolenbeek & Faber, 1991, which should be renamed *Canalispira hoffi* Moolenbeek & Faber, 1991, is also similar to our new species. Its profile is similar to *C. fluctuata* n. sp. (it has a W:L ratio of 51% to 53%). However, it has eight labial denticles on the lower half of the lip, whereas none of our new species are denticulate, even when fully mature. It has a heavily pigmented axial lined pattern with superimposed tenting comparable to *C. phantasia* n. sp. in intensity, but the regularity of the reticulated pattern of the latter sets it apart from the more haphazard tenting of *C. hoffi*. *C. hoffi* is also significantly larger at 3.7 to 3.8 mm (the lengths of the two adult paratypes in the Dayton Museum, Ohio, U.S.A.). *C. fluctuata* n. sp. and *C. ornata* n. sp. are almost 1 mm shorter – a significant difference when comparing such tiny shells.

C. minor Dall, 1927 is 6 mm in length, and is a whitish, deep water species and has a taller spire than *C. ornata* n. sp. *C. aurea* García, 2006 from 77-81 m, Bahía de Campeche, Gulf of Mexico, is also much larger at 5.2 mm. It too lacks an axial pattern. Instead, it is banded in orange and white.

An axial pattern of tent-like markings is present on the shell depicted as *Volvarina* sp. (in Lipe & Sunderland, 1991) and sp. no. 29 (in Lipe 1991, pl. 17 no. 4 and pl. 18 no. 32). This relatively large pale orange and white species from deep water off Florida's Gulf coast is allied to the species from Bahía de Campeche noted above. Neither is otherwise similar to any of our new species.

Looking at the western Atlantic species as a whole, it is evident that they differ significantly from *Canalispira* species from other parts of the world. The deeply channelled suture commonly observed in Indo-Pacific species (see *C. replicata* Figs 27, 28) is, in western Atlantic species, partially or completely callused over. Western Atlantic *Canalispira* are also weakly to strongly axially patterned, and are often orange-coloured. Indo-Pacific species are predominantly white with no decorative pattern. For all these reasons, the type species, which has no given type locality, is likely to have an Indo-Pacific origin.

Another regional variation in *Canalispira* shell morphology could be evident in West Africa, as seen in the taxon *Gibberula cucullata*, but further research is required on this species. However, all *Canalispira* possess the characteristic unifying features of a sharply defined, narrow, deeply channelled posterior notch, and, where known, unique modified cystiscid type 4 animal anatomy.

In view of the fact that we have identified three species within a short period of time and over a relatively small geographical area, it seems likely that endemism and diversity is high in the western Atlantic *Canalispira*, and that with further fieldwork, particularly in the intertidal mangrove biotope, more new species are likely to be discovered.

Species	**Size (mm)**	**W:L**	**Protoconch and spire**	**Colour Pattern**	**Columella**	**Habitat**
C. phantasia n. sp. (Figs 1-6)	2.79-3.38	47-50%	Wide and rounded apex, smooth slightly convex spire. Suture and labial shoulder indistinct.	Always dark and heavily reticulated.	Plications are strong.	Mangroves 1m in mud.
C. fluctuata n. sp. (Figs 7-12)	2.38-3.10	50-54%	Wide and rounded apex, short, smooth, convex spire. Suture indistinct. Labial shoulder distinct.	Open pattern of fine wavy axial lines. Often a distinct dorso-labial brown blotch. Pattern varies from distinct to faint.	Plications further apart than *C. ornata* and plications do not converge.	Muddy sand with rubble 2-5 m.
C. ornata n. sp. (Figs 13-18)	2.60-3.05	48-49%	Smaller, more pointed apex, proportionally taller spire. Spire straight or slightly concave. Suture and labial shoulder weakly distinct.	Very fine zig-zags forming Pointed tents. Two faint bands of darker brown on body whorl. No obvious large blotch. Pattern varies from distinct to faint.	Plications spaced closer together than in *C. fluctuata*, and 2nd and 3rd often converge.	Muddy slopes with rubble 5-15 m.

Table 1. Comparison of *C. phantasia* n. sp., *C. fluctuata* n. sp., *and C. ornata* n. sp.

ACKNOWLEDGEMENTS

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A new *Pandora* (Bivalvia: Pandoridae) from West Africa

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KEYWORDS. Bivalvia, *Pandora*, West Africa, new species.

ABSTRACT. A new species of the genus *Pandora* from Senegal is described. The new species is compared with the European and West African species from which it is separated mainly by its smaller size and an elevation on its dorsal border.

RESUMEN. Una nueva especie del género *Pandora* procedente de Senegal es descrita. Se compara con las especies europeas y oesteafricanas, de las que se diferencia, principalmente, por su tamaño menor y por la existencia de una elevación en el borde dorsal.

INTRODUCTION

Few species of the genus *Pandora* Bruguière, 1797 are present along the Eastern Atlantic coasts. Two species are known in the Mediterranean: *Pandora inaequivalvis* (L., 1758) and *P. pinna* (Montagu, 1803). Recent authors consider other taxa, such as *P. margaritacea* Lamarck, 1801, *P. rostrata* Lamarck, 1818 and *P. tenuis* Jeffreys, 1865 as conspecific (Sabelli et al., 1990, Barash & Danin, 1992, Poppe & Goto, 1993, Macedo, 1996). *P. glacialis* Leach, 1819 occurs in northern Europe (CLEMAM and Boss & Merrill, 1965).

Pandora albida (Röding, 1798) is mentioned by some authors (Tebble, 1966 and Nordsieck, 1969) but it is considered by Poppe & Goto (1991) as a form of *P. inaequivalvis*. That name is not mentioned in recent works (Bouchet, Le Renard & Gofas, 2001 and CLEMAM). Two species are mentioned in the Canary Islands: *P. pinna* and *P. inaequivalvis* (Gómez Rodríguez & Pérez Sánchez, 1997). In West Africa, only *P. oblonga* Sowerby, 1830 is known from the northern coast (Dautzenberg, 1910, 1912; Nicklés, 1947, 1950, 1955; Nordsieck, 1969) to Angola (Rolán & Ryall, 1999).

A new species of *Pandora* was found in sediments collected in West Africa. It is described below.

Abbreviations

BMNH: The Natural History Museum, London, Great Britain.
MNCN: Museo Nacional de Ciencias Naturales, Madrid, Spain.
MNHN: Muséum national d'Histoire naturelle, Paris, France.
CJH: collection of José María Hernández, Gran Canaria, Spain.
CER: collection of Emilio Rolán, Vigo, Spain.
CSG: collection of Sandro Gori, Livorno, Italy

SYSTEMATICS

Family **PANDORIDAE** Rafinesque, 1815

Shell compressed, inequivalve, dorsal border of one valve overlapping other; ligament wanting, resilium internal, occasionally reinforced by elongate lithodesma; dorsal margin edentulous but with laminar buttresses beside resilium; palial line entire (Keen in Moore, 1969).

Genus ***Pandora*** Bruguière, 1797
Type species: *Pandora inaequivalvis* (Linnaeus, 1758)

Pandora gorii n. sp.
Figs 1-3, 12-15, 18, 26

Type material. Holotype (Fig. 1) MNCN 15.07/5412; paratypes MNHN (Figs. 12-15) (1); BMNH (1); CER (Fig. 3) (1); CJH (Fig. 2) (1) and CSG (1).

Other material. One associate specimen from the type locality damaged during study.

Type locality. North of the estuary of Ziguinchor, Casamance, Senegal, dredgings at 30 m.

Description. Very thin, elongate, inequivalve shell (Figs 1-3, 12, 13), pearly within, anteriorly rounded and posteriorly rostrate; right valve flat, with two posterior ribs and a narrow plate turned towards opposite valve; left valve concave, without distinct teeth, and with a receptacle for cardinal tooth and posteriorly elongated ribs of right valve; ligament internal.

Ventral margin rather uniformly curved. Umbo hardly prominent. Dorsal margin more elongate (about three times) from the umbo to the posterior end and short anteriorly. Posterior margin straight or slightly convex; anterior margin concave due to the presence of an elevation on its tip.

Prodissoconch (Fig. 18) small, rounded ovoid, with a diameter of 178 μm.

Periostracum orange, although only fragments subsisted (mainly in the anterior portion of the shell) in the examined specimens.

Dimensions: Holotype 5.1 mm; all the paratypes have about the same or smaller dimensions. Length/height ratio between 1.92 and 2.35.

Distribution. Currently only known from the type locality.

Biotope. The present species was collected in sandy mud sediments, collected by dredging from 30 m in Casamance, Senegal.

Discussion. *Pandora gorii* n. sp. is a very small species, the largest specimen found measuring only about 5 mm in length, which is vastly different from the 25-35 mm of *P. inaequivalvis*, from which it is also distinguished because the shell of the latter is curved laterally, has a very concave posterior margin and a narrower posterior extreme. The profile of the different species are shown in Figs 26-29.

P. pinna is larger (20-22 mm) and more convex laterally; the anterior and posterior margins form a obtuse angle, whereas both are in the same line in *P. gorii* n. sp. The prodissoconch is larger.

P. oblonga occurs in West Africa, from Morocco to Angola (Figs 20-25). The shell is larger and relatively wider than *P. gorii*, the anterior margin is straight, and the prodissoconch is slightly larger. The dorsal margin is weakly concave posteriorly and straight anteriorly, lacking of any elevation.

The type material of *P. oblonga*, presumed to be in the BMNH, was not located there (Kathie Way, pers. comm.) and it may be supposed lost. So, the shell figured by Sowerby (1830: pl. 1, *Pandora* sp. f. 10) referred by Sowerby (1874: pl. 1) is the only original representation of this species.

Etymology. The species is named after Sandro Gori, Livorno, Italy.

ACKNOWLEDGEMENTS

Jesús Méndez of the Centro de Apoyo Científico Tecnológico a la Investigación made the SEM photos; the digital optical photos were made in the Department of Ecology of Jesús Troncoso.

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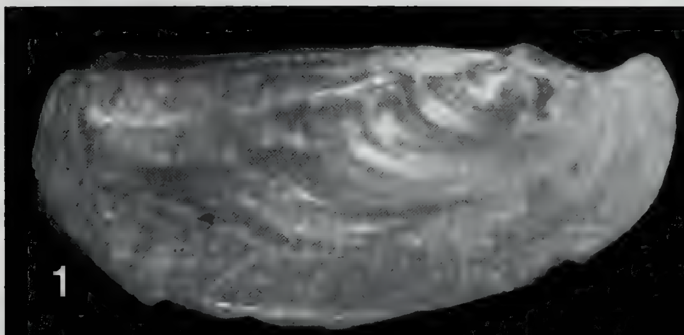
Figures 1-11

1-3. *Pandora gorii* n. sp. **1**. North of the estuary of Ziguinchor, Casamance, Senegal, dredgings at 30 m. Holotype, (MNCN), 5.1 mm; **2**. paratype, (MNHN), 4.3 mm; **3**. paratype, (CJH), 3.8 mm.
4-7. *Pandora pinna*. **4**. NW Gran Canaria (CJH), 10.4 mm; **5**. Santa Cruz de la Palma (CER), 8.8 mm; **6-7**. Fuerteventura (FH39, UTMX611182,Y3136726), 6.2 and 6.3 mm.
8-11. *Pandora inaequivalvis*. **8**. Rabat, Morocco (CER), 32 mm; **9-11**: Marbella (CJH) 30 mm.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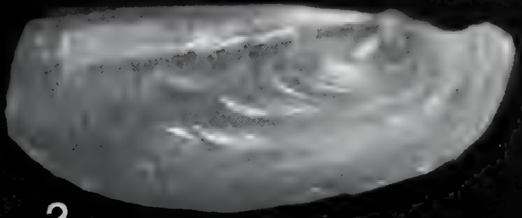
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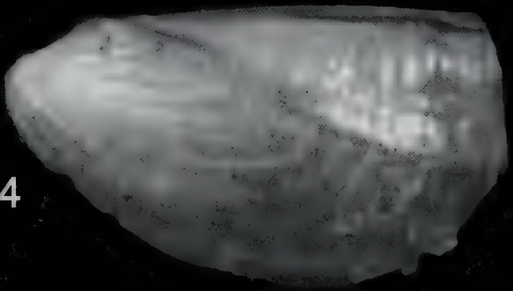
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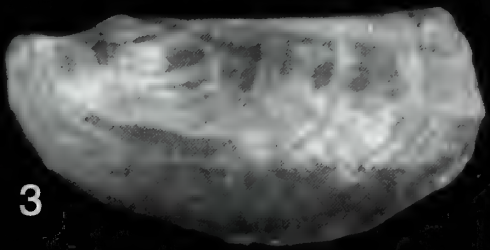
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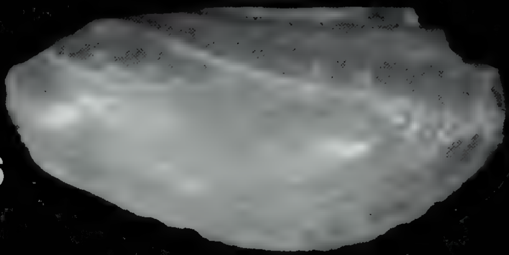
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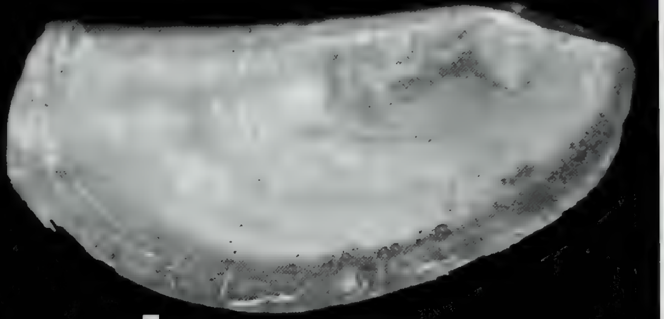
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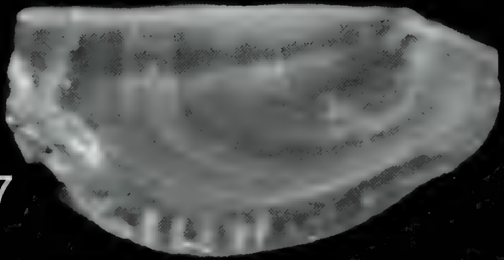
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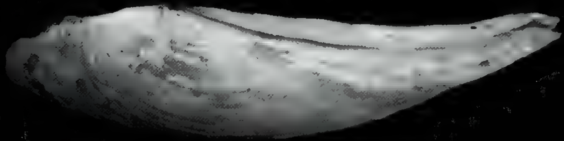
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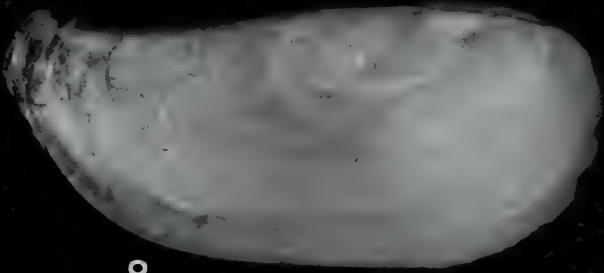
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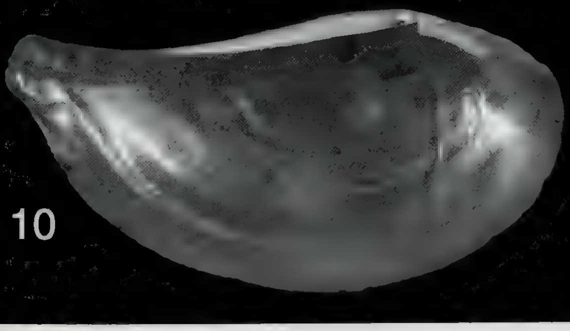
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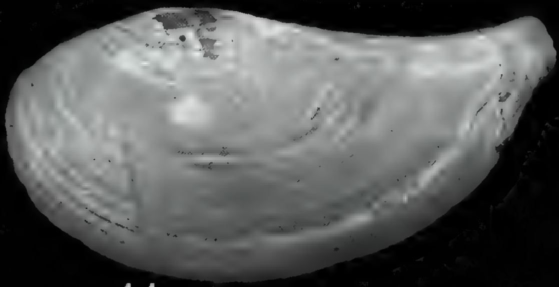
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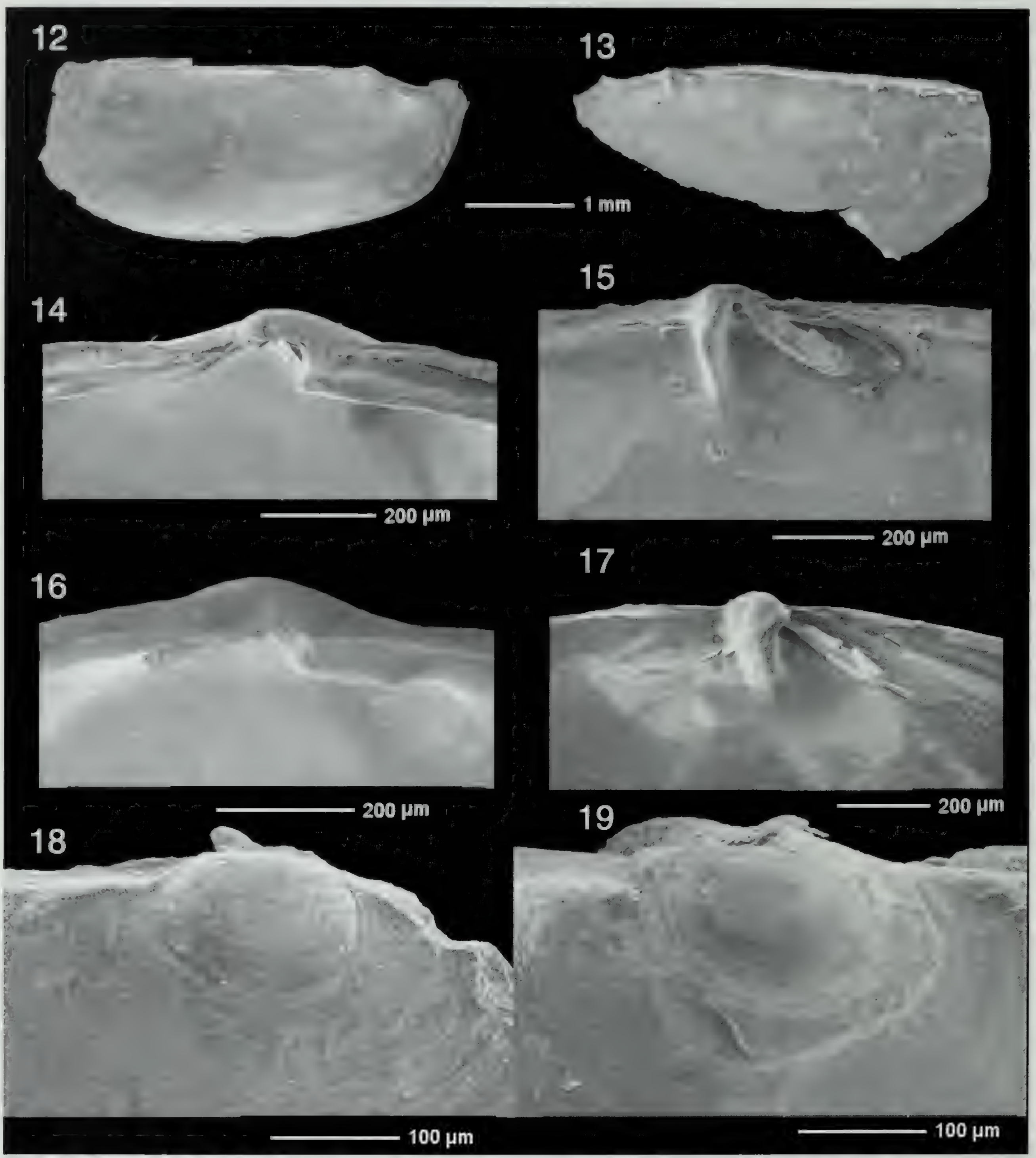
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13
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15
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200 µm
16
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18
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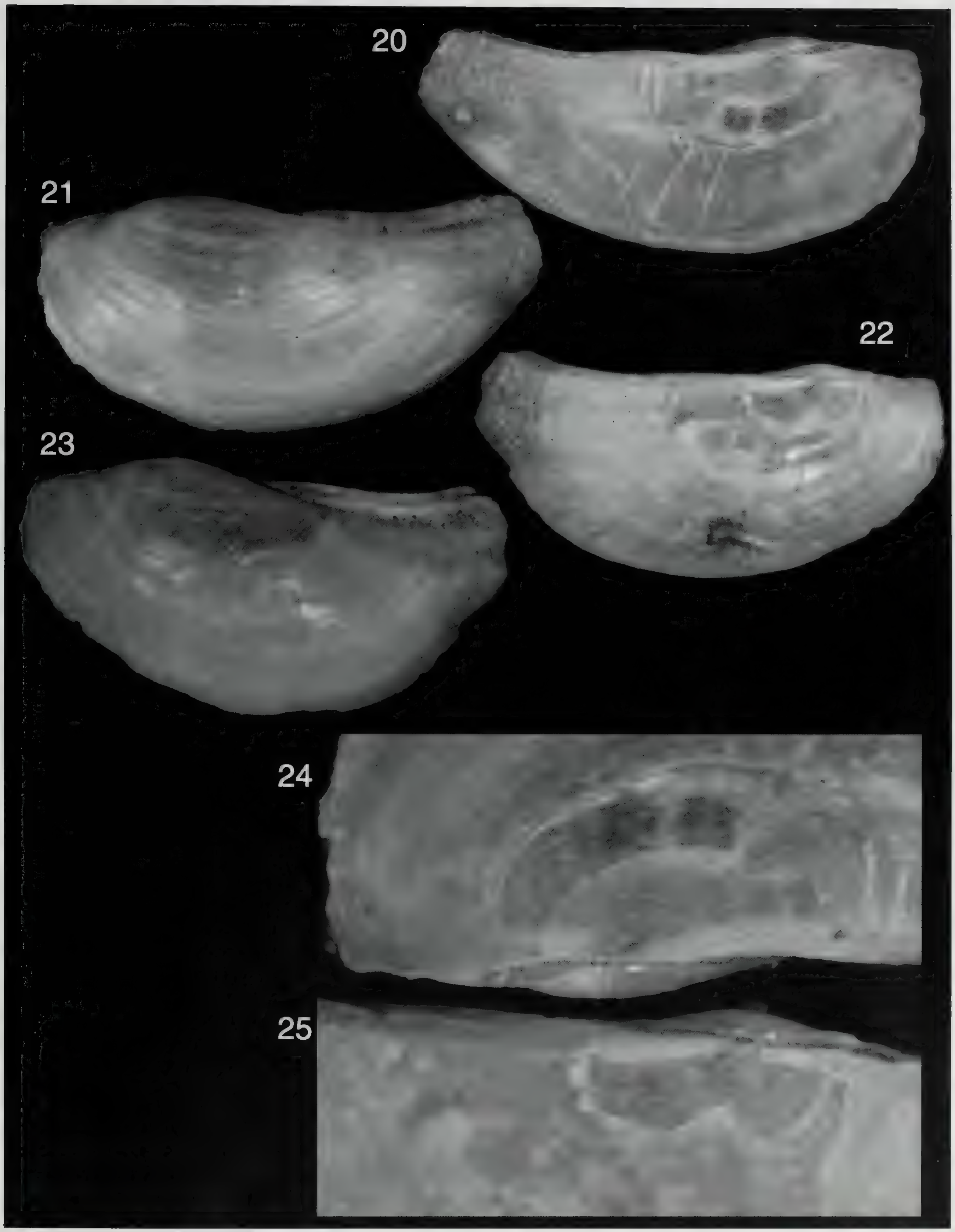
100 µm
100 µm

Figures 12-19

12-15, 18. *Pandora gorii* n.sp. **12.-13.** Valves of a paratype, (MNHN), 4.3 mm; **14-15.** Articular faces of same specimen. **18.** Prodissoconch.
16-17, 19. *Pandora pinna* (Montagu, 1803), Canary Islands. **16-17.** Articular faces; **19.** Prodissoconch.



Figures 20-25. *Pandora oblonga*. Corimba, Luanda, Angola, 20 m.

20-21, 24. Length 12 mm; **22-23, 25.** Length 10.5 mm

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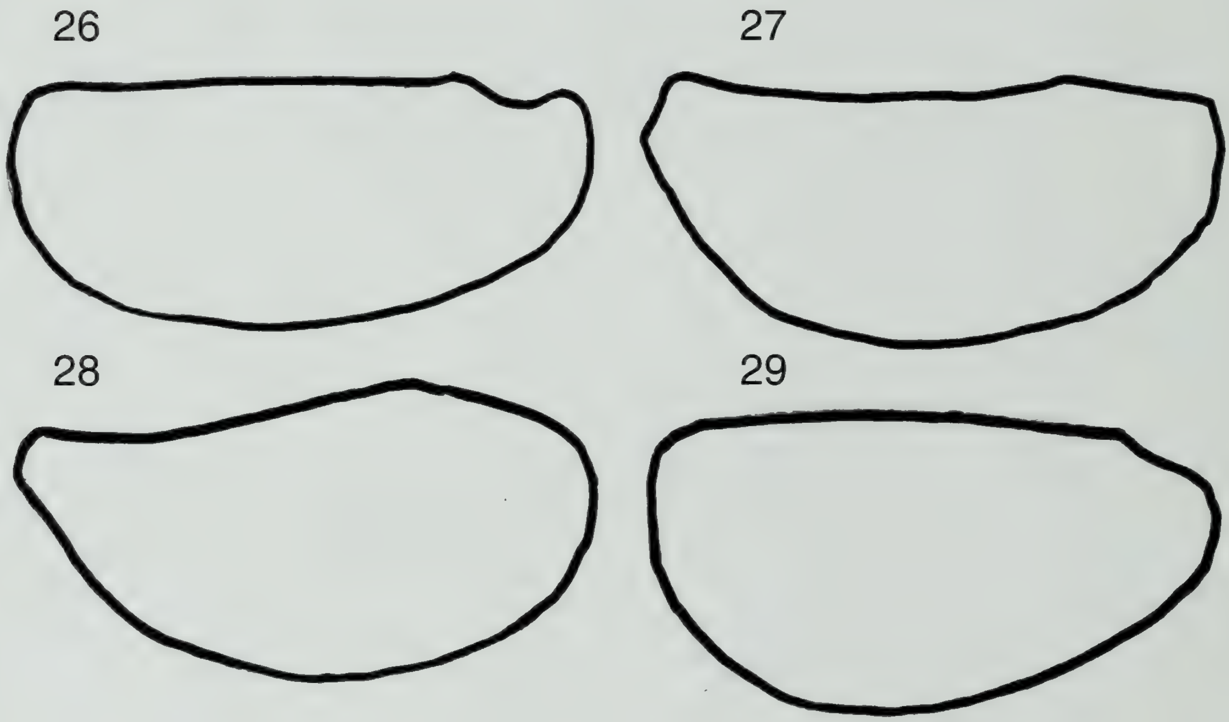

Figures 26-29. Profile of *Pandora* species
26. *P. gorii*. **27.** *P. oblonga*. **28.** *P. inaequivalvis*. **29.** *P. pinna*

NOVAPEX 8 (1): 17-21, 10 mars 2007

Description of a new *Trophon* (Gastropoda: Muricidae) from Antarctica

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KEYWORDS. Gastropoda, Muricidae, Antarctica, Weddell Sea, *Trophon*, new species.

ABSTRACT. *Trophon araios* n. sp. is described from the Weddell Sea. It is compared with *T. coulmanensis* Smith, 1907, described from the Ross Sea and with *T. veronicae* Pastorino, 1999, known from several localities from southern Chile to South Georgia.

INTRODUCTION

The Antarctic species of *Trophon* were listed, illustrated and commented by a few authors in the second half of the 20th century, in particular Powell (1951, 1957, 1958). Powell (1960) also listed a total of 26 species in his study of the Antarctic and Subantarctic Mollusca. He was followed by Cernohorsky (1977) who illustrated a few of them, mainly consisting of type material housed in the Natural History Museum, London. Cantera & Arnaud (1985) in a more general paper devoted to the prosobranch Mollusca from Kerguelen and Crozet listed a few species with new localities, but without any illustration. Hain (1990) illustrated and commented three species while, in the same year, Dell (1990) published a most interesting book, more particularly devoted to the fauna of the Ross Sea from where he commented and illustrated 11 species. Numanami (1996) commented and illustrated four species and described one new subspecies. More recently, Pastorino (2002a) described two new trophonines from the Antarctic and illustrated a few species. He also studied the systematic and phylogeny of the *Trophon* species from Patagonia and Antarctica (Pastorino, 2002b) where he listed some 33 species as *Trophon* s.s. of which three were included in the genus with reservations.

While our knowledge on Antarctic shallow water species is rather good, the deep sea floor is poorly investigated. A high amount of undescribed and rare species has been collected during the three Polarstern ANDEEP expeditions (2002 and 2005). Some of them have been described (e.g. Engl 2004, Harasewych & Kantor 2004, Engl 2006, Schrödl et al. 2006, Schwabe 2006, Engl 2007), most of them will be presented in the Atlas of Antarctic Mollusks (in prep. by the second author) and described later. The bathymetric range of these ANDEEP expeditions was from 1000 to over 5000m. So *Melanella guenteri* Engl, 2004 (an eyeless eulimid) has been described from a depth of 5194 m (Drake Passage).

A new *Trophon* will be described here. It has been collected by the Polarstern ANDEEP III Exp. (21.01. – 06.04.2005). This expedition undertook not only deep water research in the Weddell and Scotia Seas but also linked between the DIVA expeditions (Angola Basin) and former ANDEEP expeditions (Weddell Sea and Drake Passage), by first macro- and meiofauna investigation in the Cape Basin.

Abbreviations

ANDEEP: **AN**tarctic benthic **DEEP**-sea biodiversity.
ZSM: Bavarian State collection for Zoology, Munich, Germany.
P: Primary spiral cord
P1: Shoulder cord
P2-P6: Primary spiral cords of the teleoconch whorl

SYSTEMATICS

Family **MURICIDAE** Rafinesque, 1815
Genus ***Trophon*** Montfort, 1810
Type species by original designation: *Murex magellanicus* Gmelin, 1791 (= *Buccinum geversianum* Pallas, 1774); Recent, Magellanic region.

Trophon araios n. sp.
Figs 1-2, 3-7

Type material. Holotype ZSM Mol-20050867, N.W Weddell Sea, Powell Basin, 63°35.66' S, 50°42.86' W

– 63°34.65' S, 50°41.68 W, stn PS67/121-7, live collected in 2116-2118 m; 2 paratypes ZSM Mol-20050786, Weddell Sea, 70°39.37' S, 14°43.51' W – 70°40.48' S, 14°43.77' W, stn PS67/080-6, 2970-3095 m (2 fragments and 1 live collected specimen); 1 paratype ZSM Mol-20050996, E Weddell Sea, 69°24.15' S, 5°18.40' W – 69°24.63' S, 5°19.70' W, stn PS67/057-2, live collected in 1812-1822 m (juvenile).

Type locality. Antarctica, N.W Weddell Sea, Powell Basin, 63°35.66' S, 50°42.86' W – 63°34.65' S, 50°41.68 W, 2016-2118 m.

Distribution. Antarctica, Weddell Sea, alive in 1812-2970 m.

Description of the holotype. Shell thin, 39.86 high x 17.94 mm width, height/width ratio 2.22, lanceolate, broad, weakly spinose, lightly built, shoulder weakly sloping, lightly convex. Spire high with 5+ broad, convex, strongly shouldered teleoconch whorls, suture impressed. Protoconch and first teleoconch whorl eroded.

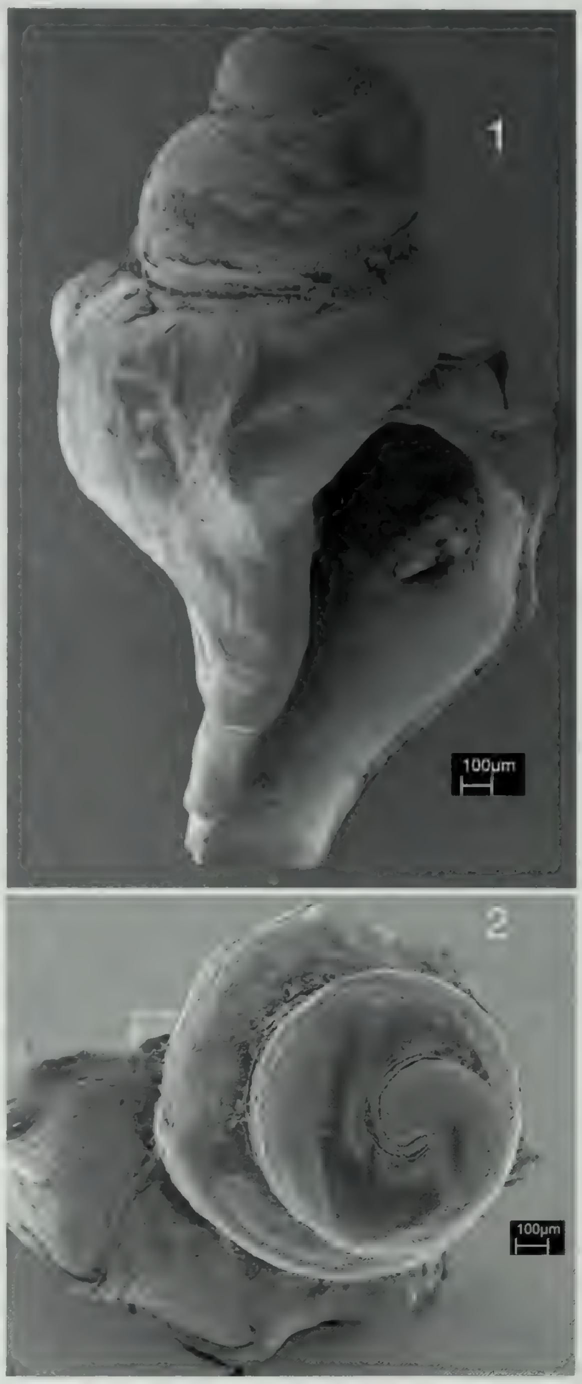
Axial sculpture consisting of low, narrow lamellae, more strongly developed at shoulder, forming short, open spines. Antepenultimate whorl with 10 lamellae, penultimate and last with 9; lamellae of other whorls eroded. Spiral sculpture low or obsolete, last whorl with quite indistinguishable, broad P1-P6. Shoulder smooth except axial lamellae.

Aperture large, moderately broad, ovate; columellar lip broad, smooth, entirely adherent, anal notch shallow, broad; outer lip smooth, thin, smooth within. Siphonal canal long, straight, broadly open, smooth. Dirty-white. Shell covered by remaining parts of thin, axially striate, white, intritacalx.

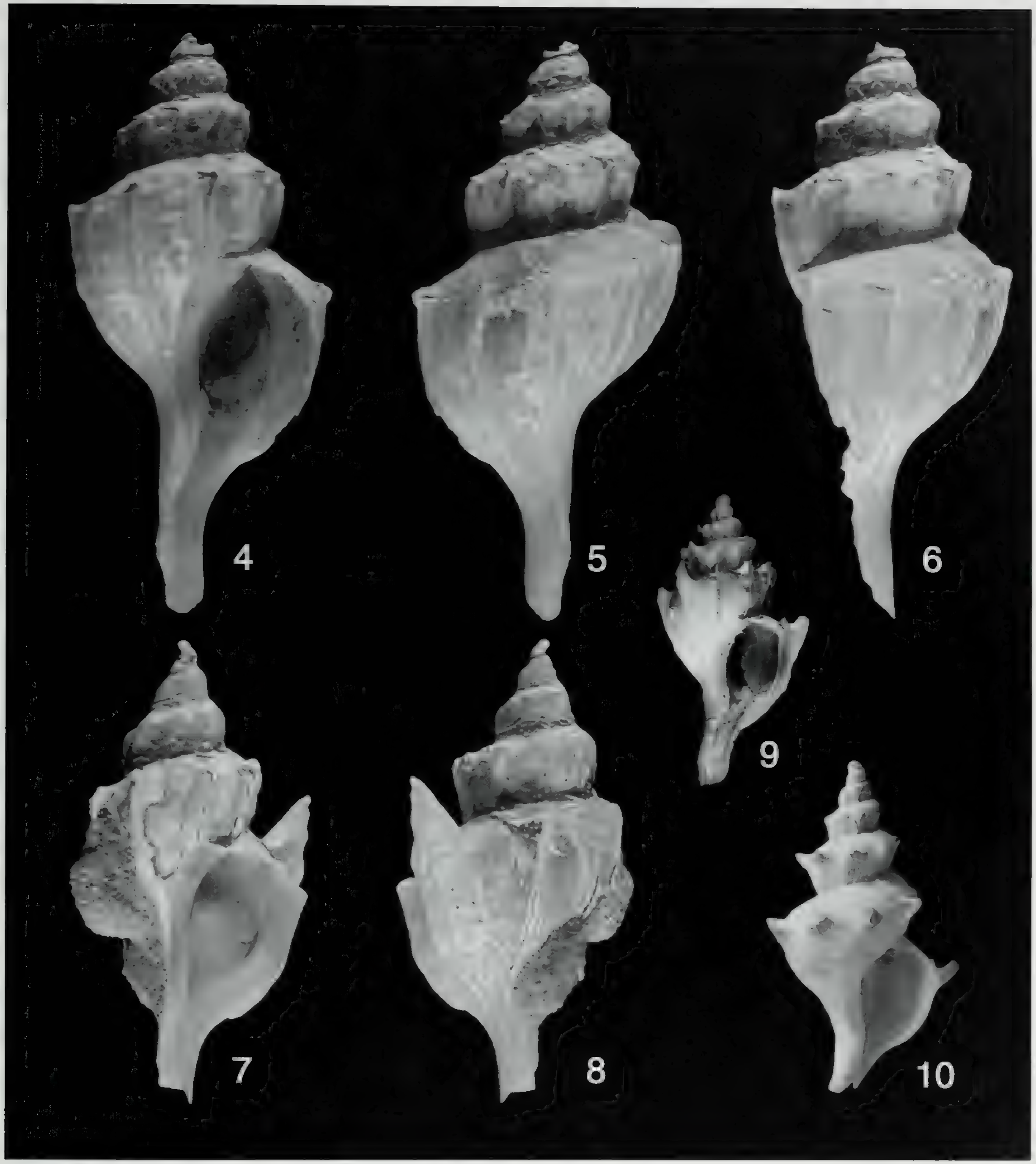
Operculum light brown, ovate with apical nucleus. Radula not examined.

Remarks. Four specimens have been dredged of which 3 live specimens and one shell consisting of 2 fragments. One specimen (paratype ZSM Mol-20050996) only consists of the protoconch and first teleoconch whorl (Figs 1-2). The Protoconch is broad with 2.15 whorls and measures 1 x 0.6 mm. The other paratype (Figs 6-7) is subadult with strongly eroded first whorls.

Discussion. *T. araios* n. sp. resembles *T. coulmanensis* Smith, 1907 (Fig. 8), described off Coulman Island in the Ross Sea (Fig. 10) but differs in having a larger, broader, and much more thinner shell with a broader, more sloping shoulder, a broader aperture, a comparatively longer siphonal canal, broad spiral cords evident on the last whorl, and in having a different protoconch consisting of more numerous whorls. Dell (1990: 201) illustrated also the holotype of *T. coulmanensis* and 3 other specimens that he identified as conspecific (his figs 357-359), however somewhat looking as *T. poirieria* Powell, 1951 (Fig. 9). He therefore suggests that *T. poirieria* should be probably considered as a synonym of *T. coulmanensis*.



Figs 1-2. *Trophon araios* n. sp. E Weddell Sea, 69°24.15' S, 5°18.40' W – 69°24.63' S, 5°19.70' W, 1812-1822 m. Paratype ZSM Mol-20050996, 3.00 x 1.7 mm.



Figures 3-9

3-7. *Trophon araios* n. sp. **3-5.** N.W Weddell Sea, Powell Basin, 63°35.66' S, 50°42.86' W – 63°34.65' S, 50°41.68 W, stn PS67/121-7, 2116-2118 m, holotype ZSM Mol-20050867, 39.86 x 17.94 mm; **6-7.** Weddell Sea, 70°39.37' S, 14°43.51' W – 70°40.48' S, 14°43.77' W, stn PS67/080-6, 2970-3095 m, paratype ZSM Mol-20050786, 25.3 x 12.6 mm.

8. *T. coulmanensis* Smith, 1907. Ross Sea, Coulman Id, 183 m, holotype BMNH 1905.9.25.52, 13.00 x 7.00 mm.

9. *T. poirieria* Powell, 1951. Bismarck Strait, Palmer Archipelago, 93-130 m, holotype BMNH 1961548, 15.00 x 8.3 mm.

His figure 357 is indeed closely related to the holotype of *T. poirieria* and could be that species, however, his figure 358 is another, yet unidentified species, while his fig. 359 is *T. coulmanensis*. We are of the opinion that *T. poirieria* is a different, valid species.

T. araios n. sp. could also be compared with *T. veronicae* Pastorino, 1999, described from southern Chile, the Strait of Magellan and off South Georgia Islands, in 298-1272 m (Pastorino, 1999: 169), but *T. araios* differs in having a broader, much thinner shell with a lower spire, a broader shoulder and aperture, lower, thinner, axial lamellae, and in having a larger, smooth, twice as broad protoconch with fewer whorls.

Etymology. *araios* (Greek): thin, weak, slight (from the very thin and weak shell).

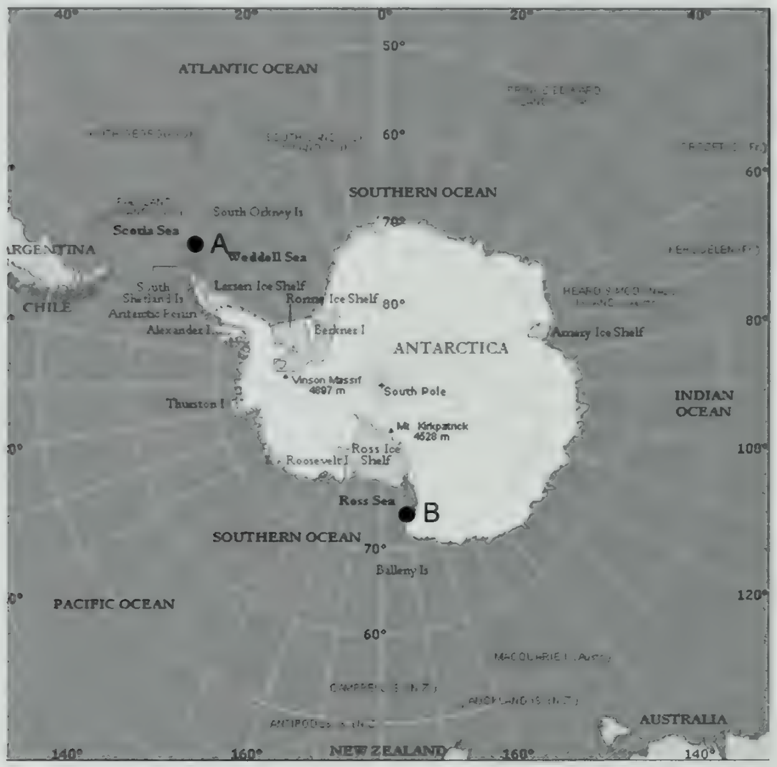

40°
20°
0°
20°
40°
50°
ATLANTIC OCEAN
60°
SOUTHERN OCEAN
60°
South Orkney Is
Scotia Sea
A
Weddell Sea
ARGENTINA
CHILE
South Shetland Is
Antarctic Peninsula
Alexander I
Larsen Ice Shelf
Ronne Ice Shelf
80°
Berkner I
Amery Ice Shelf
80°
ANTARCTICA
Vinson Massif 4897 m
South Pole
Thurston I
INDIAN OCEAN
Mt Kirkpatrick 4528 m
Ross Ice Shelf
Roosevelt I
100°
Ross Sea
B
SOUTHERN OCEAN
70°
Balleny Is
PACIFIC OCEAN
120°
60°
AUSTRALIA
140°
160°
NEW ZEALAND
160°
140°

Fig. 10. Distribution map
A. Type locality of *T. araios* n. sp.
B. Type locality of *T. coulmanensis*

ACKNOWLEDGEMENTS

This is ANDEEP contribution number 81. We are very grateful to Kathie Way (Natural History Museum, London, United Kingdom) for allowing us to study all requested type material. We thank Katrin Linse (British Antarctic Survey, Cambridge, United Kingdom), Enrico Schwabe and Jens Michael Bohn (Bavarian State collection for Zoology, Munich, Germany) for collecting and providing the mollusks of the German Polarstern ANT XXII-3 (ANDEEP III). We are grateful to Enrico Schwabe for the Scanning Electron Microscope Images and to Joseph Boscheinen (Löbbecke Museum, Düsseldorf, Germany) for the photos of *T. coulmanensis* and *T. poirieria*. We are also grateful to Klaus Groh (Hackenheim, Germany) for his kind collaboration to John Wolff (Lancaster, Pennsylvania, USA) for checking the English text and to Sophie Valtat (Paris, France) and Claude Vilvens (Oupeye, Belgium) for additional comments.

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NOVAPEX 8 (1): 23-26, 10 mars 2007

A new species of *Muricopsis* (Muricidae: Muricopsinae) from São Tome Island

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KEYWORDS. Gastropoda, Muricidae, Muricopsinae, *Muricopsis*, new species, West Africa

ABSTRACT. A new species of *Muricopsis* from São Tomé, West Africa, is described and compared with other species previously described from the same area.

INTRODUCTION

A new species of *Muricopsis* was collected among material obtained while scuba diving at 30-35 m, during a recent collecting trip to São Tomé islands. It is described in the present work.

Muricopsis s. s. is represented in West Africa by numerous species (Houart, 2005). The islands of the Guinean Gulf seem to be one of the areas where most species of this genus are present, with the type locality of one of them in Annobon, two in Príncipe and three in São Tomé.

Abbreviations

AMNH: American Museum of Natural History, New York, USA.
BMNH: Natural History Museum, London, Great Britain.
MNHN: Muséum National d'Histoire Naturelle, Paris, France
MNCN: Museo Nacional de Ciencias Naturales, Madrid, Spain.
USNM: National Museum of Natural History, Smitsonian Institution, Washington, USA.

CER: collection of Emilio Rolán
CJH: collection of José María Hernández
CPR: collection of Peter Ryall
CRH: collection of Roland Houart
CSG: collection of Sandro Gori

IP	Infrasutural primary cord (primary cord on shoulder)
P1	Shoulder cord
P2-P6	Primary cords of the convex part of the teleoconch whorl
ADP	Adapical siphonal cord
MP	Median siphonal cord
ID	Infrasutural denticle of aperture
D1 to D5	Denticles of the convex part of the aperture

[Terminology used to describe the spiral cords and the internal denticles of the outer lip (based on Merle 1999, 2001)]

SYSTEMATICS

Family **MURICIDAE** Rafinesque, 1815
Subfamily **MURICOPSINAE** Radwin & D'Attilio, 1971
Genus ***Muricopsis*** Bucquoy & Dautzenberg, 1882

***Muricopsis hernandezi* n. sp.**
Figs 1-6, 11-14

Type material. Holotype (Fig. 1) of 12.0 mm MNCN 15.05/48015; paratypes in the following collections: AMNH (1, Fig. 3), BMNH (1); MNHN Moll. 9687 (1, Fig. 2), USNM 1097976 (1), CER (3 shells and 25 juveniles, Figs. 5, 6-10), CJH (12, Fig. 4), CPR (1), CRH (1), CSG (7).

Other material. Ilha das Cabras, under rocks, 12-20 m, paratype of *M. delemarrei* Houart (2005: 121, fig. 6).

Type locality. Lagoa Azul, São Tomé Island, at a depth of 30-35 m.

Distribution. Saõ Tomé Island, Lagoa Azul, and Ilha das Cabras, 12-35 m.

Description. Shell (Figs 1-5) slender, lanceolate, spinose, solid. Protoconch of one whorl (Figs. 6, 11-13) white, with a single keel adapically and dense microsculpture formed by tubercles and lines (Fig. 14) observed under high magnification.

Teleoconch with 5-5 ½ whorls, rather increasing constantly. Axial sculpture consisting of broad ribs: first teleoconch whorl with 9, second with 8 and third with 7; last whorl with 6 or 7 ribs. Spiral sculpture of primary cords and numerous threads: first whorl with visible P1-P3, second with P1-P3, starting IP and spiral threads, third and fourth with IP, P1-P3 and numerous threads, last whorl with IP, P1-P6, ADP and MP, and numerous threads. P1-P4 of approximately same strength, P5 smaller, P6 narrow, low, almost obsolete, ADP and MP small, approximately of same strength. 2-4 spiral threads of variable strength between primary cords. Small, acute, open spines at intersection of axial ribs and spiral cords. Spines of P1 and P4 weakly larger. Cords more obvious on ribs, weak or obsolete on their intervals.

Aperture ovoid elongate; columellar lip curved with 1 or 2 slight but obvious nodes, corresponding to spiral cords; erect abapically, adherent at abapical extremity, outer lip with 5 strong broad denticles within: ID, D1 and D2 fused, broad, D3-D5. Peristome prominent. Siphonal canal short, narrowly open, slightly incurved dorsally.

Background colour pink-cream; dark brown blotches on shoulder, between P2 and P4, near P3, P5, ADP and MP, and on crossing points between spiral cords and axial ribs. Aperture greyish white with yellowish brown line on edge.

Remarks. The paucispiral protoconch in West African *Muricopsis* species, denoting non-planktotrophic larval development, is probably the reason of their endemism, restricted to some islands or well delimited areas. This is probably the reason also why several populations got isolated during their adaptation to different habitats, even within one island.

Muricopsis hernandezi n.sp. differs from all other species living in the São Tomé island or having similar shells:

M. richardbinghami Petuch, 1987 from Florida, USA, is comparatively larger, the background colour is tan with red bands, and the siphonal canal is much longer and broader.

M. matildae Rolán & Fernandes, 1991, from São Tome has a reddish not spinose shell with nodules and the protoconch is constantly dark. *M. rutilus* (Reeve, 1846) from Ghana and *M. mariangelae* Rolán & Fernandes, 1991 from São Tome (Figs 7, 8) have nodulous axial ribs, the cords are also present in the intervals and the colour is distributed in bands: dark subsuturally, white below; another dark one in the last whorl visible in a short portion of the suture in previous whorls; another white one below; the base is dark. When the lips are well developed, the aperture is wider than in *M. hernandezi*; also, the external lip is narrower and without spines.

M. delamarrei Houart, 2005, from Principe Island (Fig. 10), has a colour pattern similar to that of the two previous species; most of the whorls have nodules on the crossing points of ribs and cords, and there are spines only on the last whorl.

The existence of some shells with a very different pattern (Fig. 9) suggests the possibility of more species being present in São Tomé, in yet unexplored habitats.

Etymology. The species is named after José María Hernández, diving and collecting companion in the recent expedition to São Tomé.

ACKNOWLEDGEMENTS

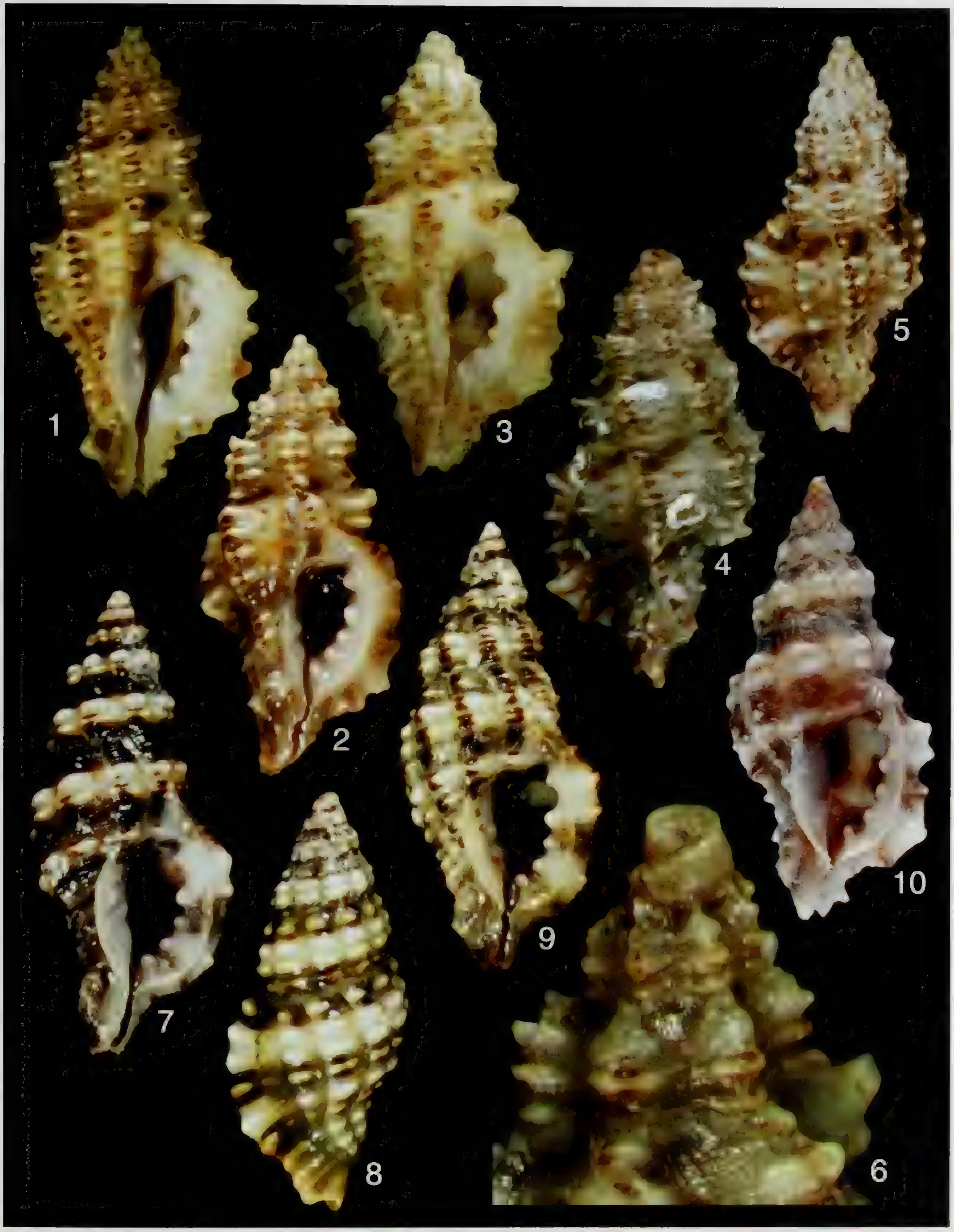
To Jesús Méndez, who made the SEM photographs in de Centro de Apoyo Científico y Tecnológico a la Investigación (CACTI) of the University of Vigo; to Jesús S. Troncoso, of the Department of Ecology of the University of Vigo for his authorization to use his equipment for the optical photos. To Roland Houart who made important suggestions in order to better the work. António A. Monteiro made the English revision.

Figures 1-10

1-6. *Muricopsis hernandezi* n.sp. **1.** Lagoa Azul, São Tomé Island, at a depth of 30-35 m.Holotype, (MNCN 15.05/48015), 12.0 mm; **2-5.** Paratypes: **2.** (MNHN Moll. 9687), 11.3 mm; **3.** (AMNH), 11.1mm; **4.** (CJH) 10.5 mm; **5.** (CER), 10 mm; **6.** Protoconch and first whorls of teleoconch, paratype (CER).

7-8. *Muricopsis mariangelae* Rolán & Fernandes, 1991, São Tomé **7.** 11.9; **8.** 10.5 mm; 9. *Muricopsis* cf. *mariangelae,* unusual pattern, 11.0 mm.

10. *Muricopsis delamarrei* Houart, 2005. Principe Islands (holotype MNHN), 11.4 mm (photo R. Houart).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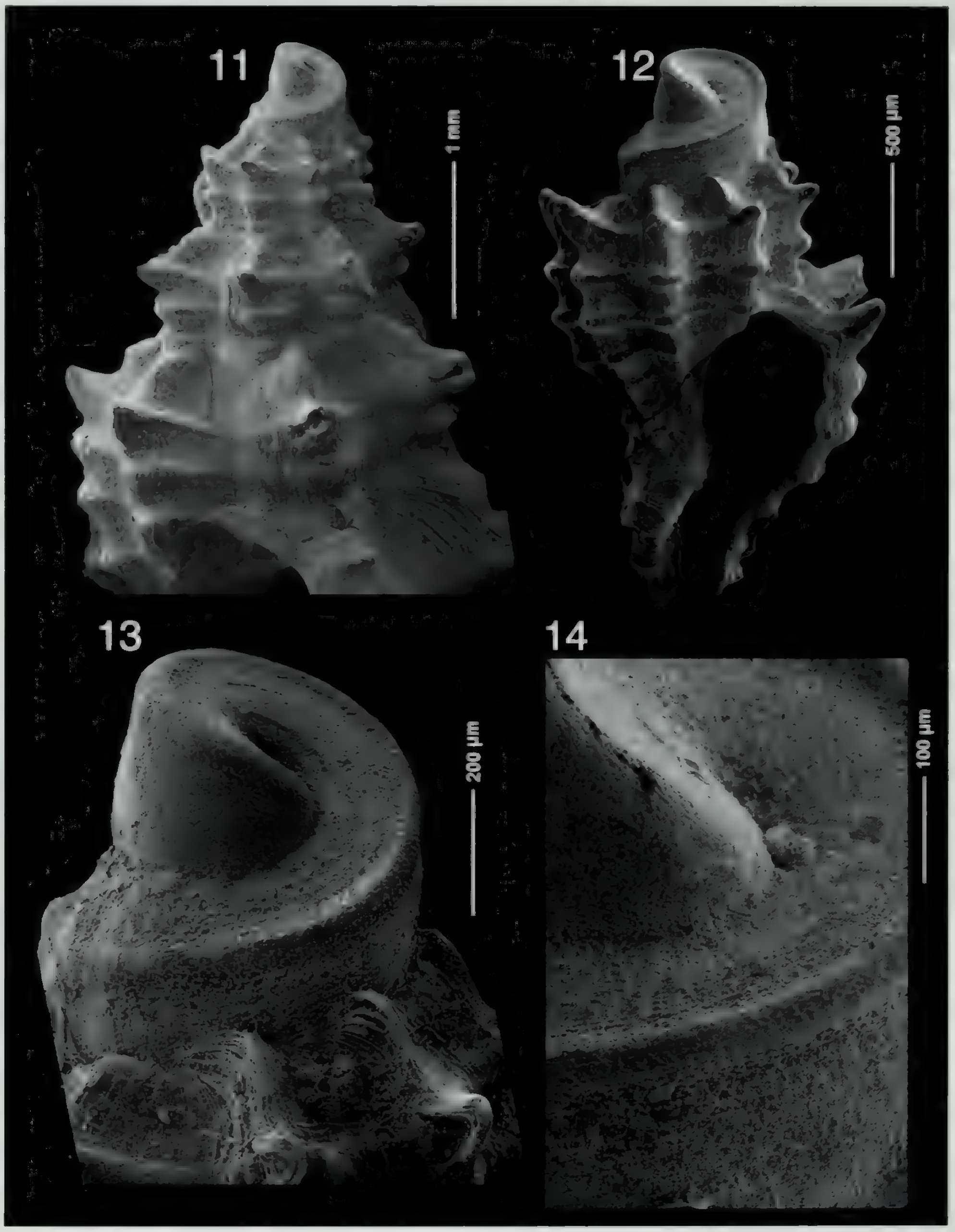

Figures 11-14.

11-12. Protoconch and first whorls of teleoconch of *Muricopsis hernandezi*, paratypes (CER). **13.** Protoconch. **14.** Microsculpture.

NOVAPEX 8 (1): 27-28, 10 mars 2007

NOTES

Chama aspersa Reeve, 1846 (Bivalvia: Chamidae) another established Lessepsian invader in the Mediterranean Sea

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KEYWORDS. Mollusca, Bivalvia, Chamidae, *Chama aspersa*, distribution, Mediterranean.

ABSTRACT. The Indo-Pacific bivalve *Chama aspersa* Reeve, 1846 seems to have established itself very well in the eastern Mediterranean. The species is also recorded herein from Turkish coasts.

DISCUSSION

The species of *Chama*, commonly known as "jewel boxes" have the lower valve with an anti-clockwise growth direction. The bivalves are attached by the lower valve to the substrate or some other object. In the Mediterranean Sea there are four recorded species (CLEMAM) of CHAMIDAE. *Chama gryphoides, C. circinata* Monterosato, 1878 and *Pseudochama gryphina* (Lamarck, 1819) are the three Mediterranean endemic species while *C. pacifica* Broderip, 1834, a Lessepsian species, is already known to have established itself well in the eastern Mediterranean (Bogi & Galil 1997, Çeviker 2001, Mienis 2006). Mienis (2006) also records the presence of *Chama asperella* Lamarck, 1818 and *Chama aspersa* Reeve, 1846, as 'well established Lessepsian species along the coast of Israel'. *Chama aspersa* Reeve, 1846 is a very common Indo-Pacific species. Its invasion into the Mediterranean Sea was first recorded by Mienis (2004) from three loose upper valves found on three different beaches along the coast of Israel. Later, Mienis (2006) listed *Chama aspersa* as a well established species along the coast of Israel. The most striking characteristic of this species is the colour pattern of two or three red-brown lines or bands radiating from the umbo on the top or right valve.

We would like to record herein the presence of this species at Mersin and Marmaris, Turkey. A few living specimens were found by one of us (P.O.) during several dives at these localities (June/July 2006) in shallow waters of from 5 to 10 meters depth. At both these localities the specimens were attached to rocks or to bivalves such as *Spondylus gaederopus* Linnaeus, 1758 (Figs 1-2). The size of the specimens varied from 12 to 23.5mm. *Chama pacifica* was also present at these localities.

C. aspersa seems to have established itself very well and its distribution in the Mediterranean from its first findings has substantially increased. The species has become rather common at the coasts of Israel (Mienis *pers. comm.*). Whether these invasive species are taking over from the established local species has still to be evaluated.

ACKNOWLEDGEMENTS

We would like to thank H. K. Mienis from the Tel Aviv University Israel for important literature and an unknown referee for important comments.

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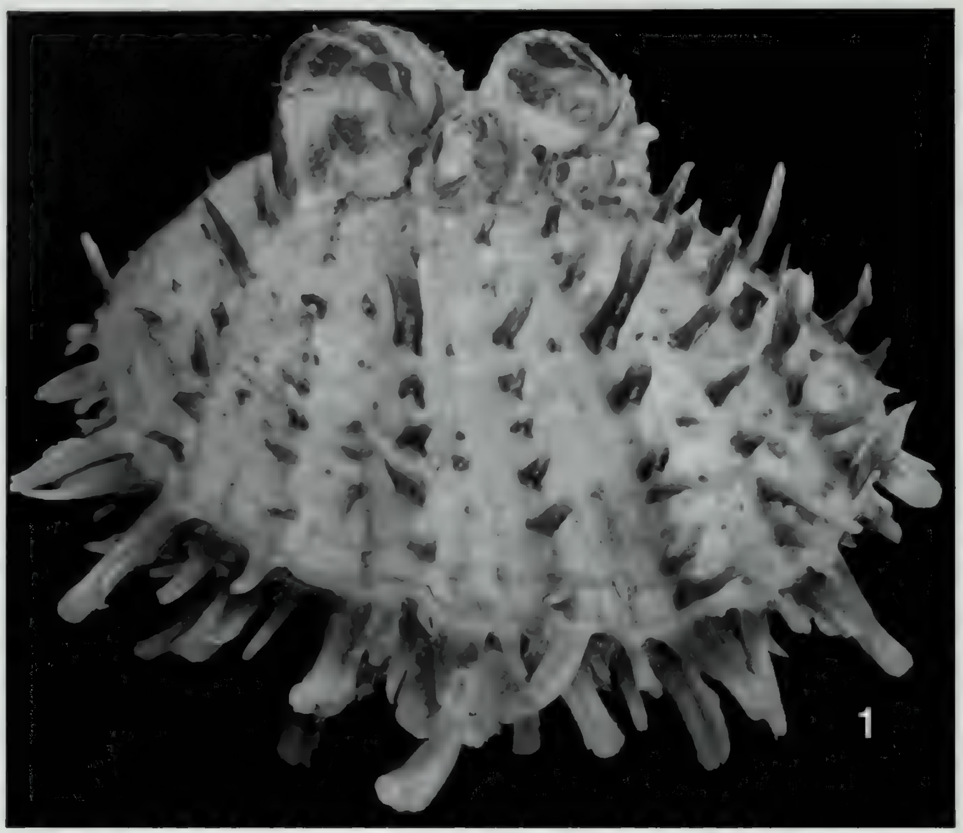

Fig. 1. Three specimens of *Chama aspersa* Reeve, 1846 attached to a *Spondylus gaederopus* Linnaeus, 1758. Size: 90 x 74.5mm.

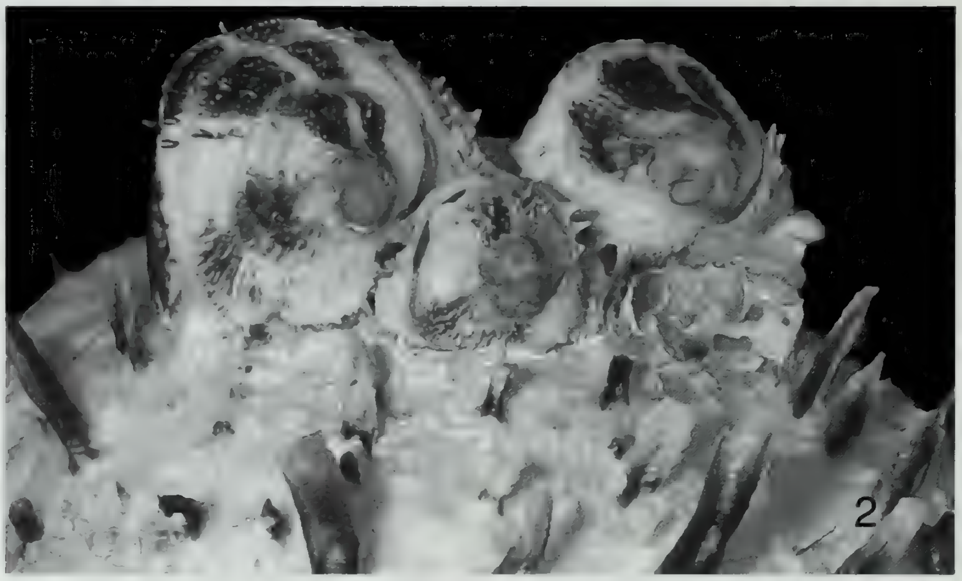

Fig. 2. Close up on the specimens of *Chama aspersa* Reeve, 1846. Left specimen 20 x 18mm, central specimen 13 x 10mm, right specimen 17.5 x 15mm.

Haminoea cyanomarginata Heller & Thompson, 1983 (Gastropoda: Haminoeidae), a new invader for the Maltese Islands

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KEY WORDS. Mollusca, Opisthobranchia, Haminoeidae, *Haminoea cyanomarginata*, Lessepsian species, distribution, Malta, Central Mediterranean.

ABSTRACT. Living specimens of the lessepsian opisthobranch mollusc *Haminoea cyanomarginata* Heller & Thompson, 1983 were found in Maltese waters at the centre of the Mediterranean Sea. This record extends the range of distribution of the species into the Mediterranean.

MATERIAL AND METHODS

Several live specimens with a shell size ranging from 2 to 4mm (with mollusc 4-8mm) of *Haminoea cyanomarginata* Heller & Thompson, 1983 (Fig. 1) were found, on several separate occasions during October and November (2006). The specimens were found in weeds and algae brought up in fishermens' tackle from around meadows of *Posidonia oceanica* (Linnaeus) Delile, from off Id-Delli (2 specimens), off Gnejna Bay (15 specimens) and off Fomm ir-Rih Bay (4 specimens), limits of Mgarr, Malta, in depths of 20-50 m. This includes a stretch of coastline of about five kms.

The material consisted of fresh dead leaves of *P. oceanica* and some other dead algae, which at this time (autumn) are carried by the storms and currents from the actual meadows of the plant, either to the beaches or to deeper water, depending on the direction of the flow of the currents.

In each case, the material was rinsed in fresh water and then passed through a sieve with 0.5 mm mesh. The residue was then immediately replaced in a container with sea water and later examined under the microscope. Other live molluscs which were also present, besides the specimens of *H. cyanomarginata*, consisted of *Rissoa violacea* Desmarest, 1814 and *Rissoa membranacea* (J. Adams, 1800) with a few juvenile specimens of *Ocinebrina aciculata* (Lamarck, 1822). There were also a few specimens of *Bittium latreillii* (Payraudeau, 1826) *B. reticulatum* (Da Costa, 1778), two specimens each of *Petalifera petalifera* (Rang, 1828) and *Ocinebrina hybrida* (Aradas & Benoit, 1876) and one specimen of *Typhinellus labiatus* (Cristofori & Jan, 1832).

DISCUSSION AND CONCLUSION

The species was described by Heller & Thompson (1993) from the Sudanese Red Sea. It is easily distinguished from the other Mediterranean congeners by its mantle bordered with purple or dark blue and scattered vivid-yellow blotches all over. The soft parts as seen through the transparent shell are bluish and have yellow-orange blotches of various sizes. The eyes are black and surrounded with a dark-purple patch, forming a sort of mask.

This Indo-Pacific species is one of the recent lessepsian immigrants entering into the Mediterranean Sea through the Suez Canal. Although its Mediterranean distribution has not been published extensively in the literature (Zenetos *et al.* 2004), it had been recorded earlier by Koehler (2003) and later by Saltik (2005) from Turkey, by Mifsud (2005) (Fig. 2) and byYokes (2005) from Greece. The species is also listed in CLEMAM.

It seems that *Haminoea cyanomarginata* has found ideal conditions of life in the Mediterranean, because it is spreading rather rapidly. The species may have arrived locally through ships ballast water, because the location, being on the westerly side of the Island, is sheltered from strong easterly winds and is therefore an active ship bunkering site during such weather conditions.

ACKNOWLEDGEMENTS

I would like to thank an unknown referee for important comments and corrections on the manuscript.

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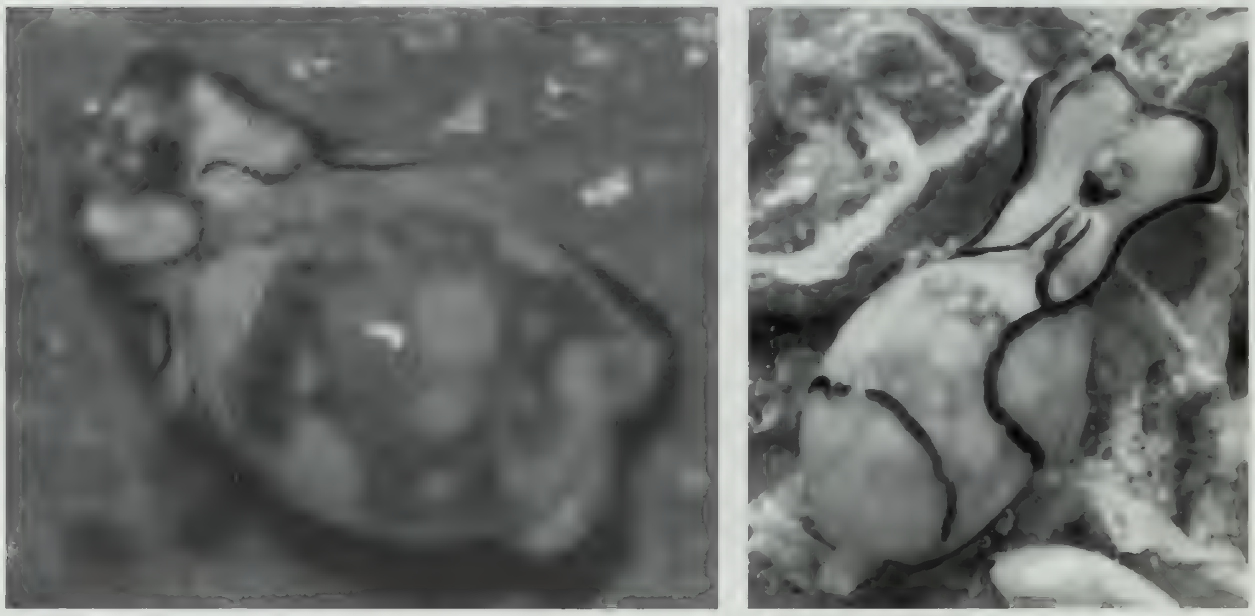

Figures 1 - 2. *Haminoea cyanomarginata* Heller & Thompson, 1983
1. Off Id-Delli, Malta
2. Greece (photo P. Ovalis)

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Powell, A.W.B. 1979. *New Zealand Mollusca. Marine, land and freshwater shells.* William Collins Publishers Ltd: xiv + 500 pp.
Mayr, E. 1989. Attaching names to objects. In: *What the philosophy of biology is : essays for David Hull* (M. Ruse, ed.), Klumer Academic, Dordrecht: 235-243.

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(suite)

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Mollusks

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Claude VILVENS

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SAMEDI 21 AVRIL 2007

Kevin Monsecour : La famille des Columbellidae

Du plus haut intérêt pour tous ceux que cette famille intrigue et intéresse : Kevin va nous assurer une introduction et une présentation des différents genres de cette famille.

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SAMEDI 12 MAI 2007

Tout le monde : L'excursion de printemps de la SBM.

Les beaux jours reviennent et avec eux l'envie d'aller sur le terrain …

Où irons-nous chercher nos amis mollusques ;-) ? Comme d'habitude, le choix de la zone que nous prospecterons n'est pas encore fixé – nous terminons à peine l'hiver et notre équipe de reconnaissance (= Claude et Etienne pour cette fois) va déterminer l'endroit au retour du printemps. Nous lorgnons du côté de la France, mais chut …

Comme d'habitude aussi, le plus simple pour obtenir les dernières informations est de consulter notre site Internet (http://users.swing.be/sw216502/ ou http://www.sbm.be.tf) ou encore de contacter quelques jours auparavant soit Claude (vilvens.claude@skynet.be ou 04/248.32.25), soit Roland (roland.houart@skynet.be ou 016/78.86.16). Comme d'habitude, il convient de prévoir d'emporter sa bonne humeur, un guide de détermination … et sans doute aussi bottes et vêtements de pluie (en principe, il fera magnifique, mais bon ;-) …).

***

SAMEDI 26 MAI 2007

Etienne Meuleman : L'usage de la coquille dans les arts premiers

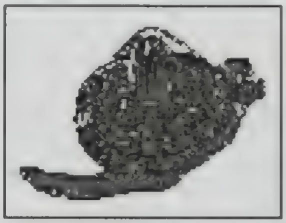
Dans la série hommes et coquillages, une fabuleuse histoire à travers l'espace et le temps, notre spécialiste des Strombes et des Dulcicoles nous ramène aux premiers âges : depuis toujours, les hommes ont utilisé des matériaux naturels pour créer et confectionner des objets divers. Art ou artisanat ? Où se situe la limite? Nous explorerons les quatre grandes parties du monde considérées comme étant le berceau des arts premiers: l'Amérique du Nord, L'Afrique centrale, l'Australie et l'Océanie. Bon voyage !

***

Réservez déjà dans vos agendas les 23juin, 8 septembre, 29 septembre (excursion) et 13 octobre 2007.

Pour les informations de dernière minute :

http://users.swing.be/sw216502/ ou http://www.sbm.be.tf



Tous les articles généraux sont les bienvenus pour Novapex/Société ☺ !

Afin de faciliter le travail de la Rédaction, il est vivement souhaité de respecter les règles suivantes pour les articles proposés :

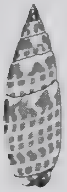
- document MS-Word (pour PC Windows 2000 ou XP);
- police de caractères Times New Roman;
- texte de taille 10, titres de taille 12;
- interligne simple;
- toutes les marges à 2,5 cm;
- photos en version électronique JPG.

Merci !

Le rédac'chef ;-)

Les verres du 40ème anniversaire de la SBM

Il reste quelques exemplaires de ces verres "long drink" estampillés au logo du 40ème anniversaire. Ils sont toujours en vente au prix de 3 EUR dans la limite du stock encore disponible. On peut contacter l'un des membres du conseil d'administration à ce sujet.



Le 40ème anniversaire de la Société Belge de Malacologie

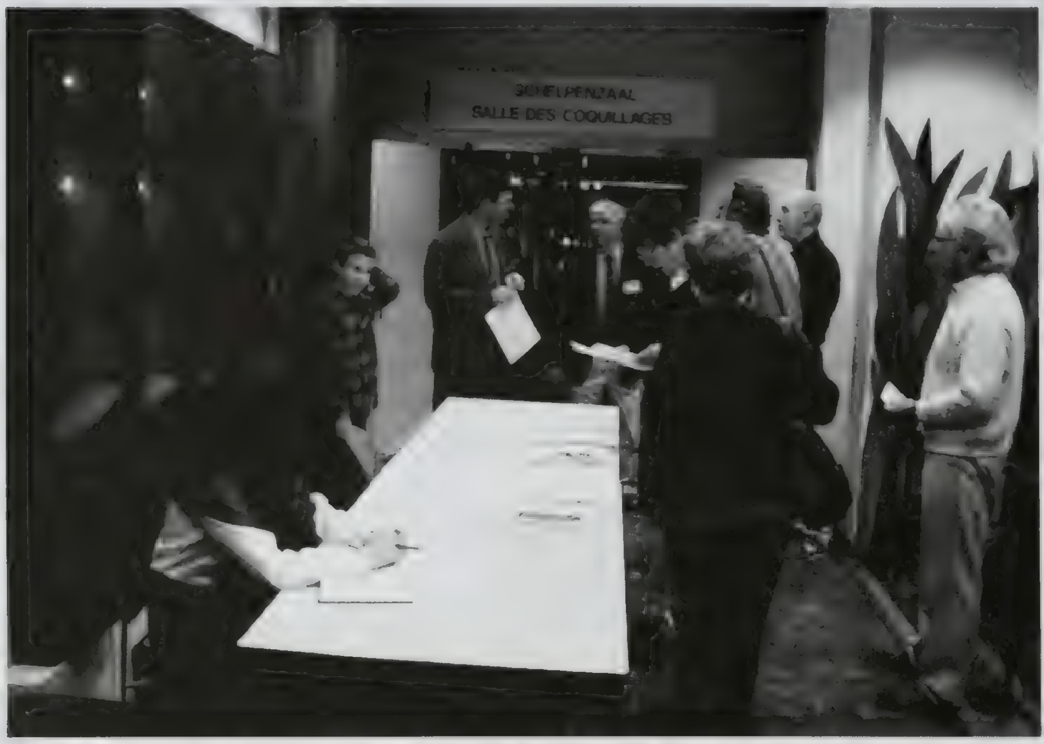
Claude VILVENS
– photos de Sophie VALTAT et Roland HOUART

SBM 40 ANS
1966-2006
Société Belge de Malacologie

Notre Société Belge de Malacologie existe, dans sa forme actuelle (car des sociétés similaires l'ont précédée aux 19ème et 20ème siècles), depuis 1966 et a donc fêté ses 40 ans en cette année 2006 ! Elle a voulu célébrer cet anniversaire par une grande manifestation dénommée "**Une journée à l'Institut royal des Sciences naturelles de Belgique**" qui s'et déroulée ce **samedi 25 novembre 2006**.

En fait, l'équipe du Conseil d'administration préparait l'événement depuis des mois. Ce fut donc de bon matin que tout le monde se trouva en place, avec l'aide des conjoints et même des enfants ;-) !

INSECTENZAAL
SALLE DES INSECTES



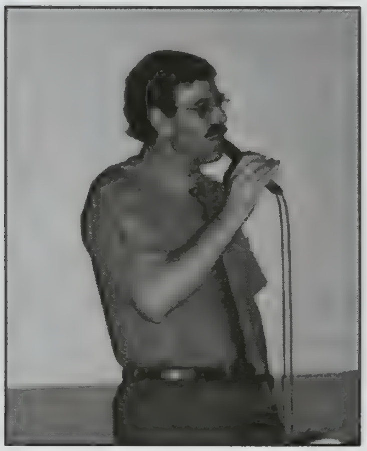
Durant la matinée se déroulèrent des **visites guidées** par des membres de la SBM dans la salle d'exposition consacrée aux mollusques à l'Institut royal des Sciences naturelles de Belgique (IRSNB). Bon nombre de naturalistes eurent ainsi l'occasion de découvrir le monde de la malacologie, souvent mal connu des amateurs, par exemple, d'ornithologie ou de botanique. Le public se montra fort intéressé et le nombre de questions posées montraient un réel intérêt. Pour les guides, ce fut un moment fort agréable que de partager leur passion avec des amateurs de nature de tous les horizons.

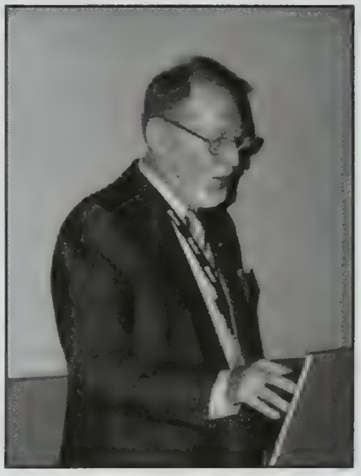
Le temps de midi fut l'occasion pour les participants du matin et ceux de l'après midi (souvent, ce furent les mêmes !) de se rencontrer et de discuter autour d'un lunch (pas trop lourd pour ne pas dormir après ;-) !).

L'après-midi fut consacrée à un cycle de conférences sur divers aspects de la malacologie et de la SBM.

Après une introduction de bienvenue par **Roland Houart**, Président de la SBM, les divers intervenants se succédèrent dans l'ordre suivant :

1) **Claude Vilvens**, Vice-Président de la SBM, présenta un panorama général de la faune malacologique, avec sa diversité et ses caractéristiques générales, dans son exposé tout public "**Voyage en images dans le monde des Mollusques**". Objectif bien clair : que tout le monde ait une idée globale de ce qu'est un Mollusque, des principales classes existantes (Gastéropodes, Bivalves, Polyplacophores, Scaphopodes, Céphalopodes, …), des habitats qu'ils ont colonisés, des coquilles que beaucoup d'entre eux portent, etc.





2) L'exposé "**Panorama de 40 ans d'activité de la SBM**" permit tout d'abord à **Ralph Duchamps**, Président honoraire de la SBM, de retracer l'historique de la société, avec ses débuts difficiles et ses problèmes (qui sembleront bien familiers aux membres d'autres sociétés similaires de par le monde ;-)); il fut suivi par **Roland Houart** et **Claude Vilvens**, qui décrivirent les activités actuelles de la SBM. En bref, il faut rappeler que la SBM est une société scientifique d'expression francophone basée en Belgique qui vise à rassembler tout qui veut

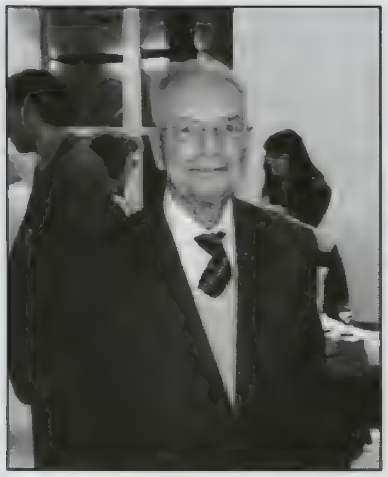
approfondir l'étude des mollusques (marins, terrestres et d'eau douce) ainsi que la compréhension des divers biotopes de ceux-ci. La SBM s'appuie à la fois sur les traditions mais aussi sur les projets d'avenir. En effet, elle veut d'une part s'inscrire dans la lignée des sociétés savantes issues de l'engouement pour l'œuvre de Darwin et de Linné, mais, d'autre part, elle s'intéresse à la biodiversité et à la protection des mollusques, ceci grâce aux travaux de ses membres qui décrivent de nouvelles espèces du monde entier et de ceux qui étudient sur le terrain les mollusques de Belgique. La SBM comporte à l'heure actuelle plus ou moins 200 membres actifs, amateurs ou professionnels. Ses activités, basées sur le bénévolat, sont essentiellement ses réunions (en général, une toutes les 3 semaines à Bruxelles, avec une conférence sur un sujet concernant la malacologie), ses excursions (2 à 3 par an), ses publications (Novapex régulier et des numéros spéciaux) ainsi qu'une exposition annuelle.

3) Vint ensuite celui qu'attendaient tous les malacologues confirmés : le Dr **Philippe Bouchet** du Muséum national d'Histoire naturelle de Paris, qui entretint le public d'un sujet ô combien actuel : "**Entre exploration et crise de la biodiversité, quelle stratégie pour l'inventaire de la faune malacologique du monde ?**". Partant d'un exemple basé sur les Coléoptères, Philippe Bouchet tira le constat que, si l'on connaissait aujourd'hui grosso modo 2 millions d'espèces, il en restait probablement entre 5 à 50 fois plus à décrire. Au rythme auquel avancent actuellement les systématiciens, il leur faudrait des centaines d'années pour en venir à bout et, de toute manière, ils n'auraient sans doute pas le temps de décrire toutes les espèces avant que bon nombre d'entre elles ne disparaissent : le taux d'extinction actuel est en effet évalué de 100 à 10000 fois plus élevé que celui de l'extinction naturelle. La conclusion saute aux yeux : il faut inventorier la faune plus rapidement qu'on ne le fait pour l'instant. Comment ? Augmenter les effectifs de systématiciens est irréaliste et impossible. Ce que prône Philippe Bouchet : créer une chaîne d'intervenants dans le mécanisme de cet inventaire en les spécialisant. On devrait ainsi distinguer les récolteurs (avec leurs connaissances techniques de terrain), les trieurs-préparateurs (des habitués au coup d'œil imparable pour distinguer les formes de vies apparentées mais différentes), les spécialistes de la détermination proprement dits (qui décident de ce qui est nouvelle espèce ou espèce connue) et des descripteurs (capables de rédiger une description correcte sur base des indications des spécialistes).

4) Pour clôturer, **Christiane Delongueville** et **Roland Scaillet**, sociétaires de la Société Belge de Malacologie, présentèrent un exposé sur "**Les espèces invasives en Méditerranée**". Spécialistes de la malacolofaune européenne, ils nous emmenèrent du canal de Suez vers la mer Egée en nous montrant toute une série d'espèces venues de Mer Rouge et en nous expliquant les mécanismes de ces invasions.

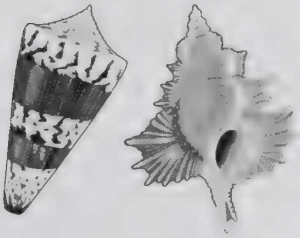
Avant de terminer la séance académique, Mr Anthonie van Peursen, membre du conseil d'administration de la Société Néerlandaise de Malacologie, remit à Roland Houart un numéro spécial et relié de BASTERIA dédié aux 90 ans de J.G.J. Kuyper.

Comme il se doit, la journée se termina par le verre de l'amitié qui permit de prolonger les débats dans de nombreuses conversations où se mêlaient, outre les membres des sociétés malacologiques francophone et flamande de Belgique (merci aux amis de la BVC pour leur large présence ☺ !), des participants Français, Néerlandais, Allemands et même Japonais !

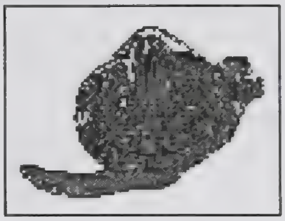


En conclusion, cette célébration du $40^{ème}$ anniversaire de la SBM fut une réussite dont chacun eut à se féliciter !

Claude Vilvens



L'exposition 2007 de la SBM : Au lendemain du 40ème anniversaire



Claude VILVENS –
photos: Roland HOUART et Claude VILVENS

avec les contributions écrites de Christiane DELONGUEVILLE, Ralph DUCHAMPS, Roland HOUART, Annie LANGLEIT, Etienne MEULEMAN, Roland SCAILLET, Jacques SENDERS, Sophie VALTAT et Edgar WAIENGNIER

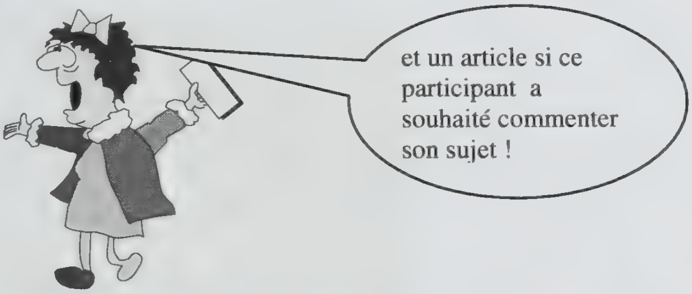
Selon un usage maintenant bien établi, la première réunion de l'année de la Société Belge de Malacologie a été consacrée ce **13 janvier 2007** à son Exposition : ses membres ont présenté quelques fleurons de leur collection et les ont commentés avec sagacité et bonne humeur ☺

Pour rappel, l'Exposition est destinée à tout le monde et tout le monde est donc le bienvenu. Comme d'habitude, nous avons retrouvé quelques membres que leurs activités retiennent loin de nous, notamment notre ami Guido Poppe et son équipe de choc ;-).

Comme lors de chaque édition, nous allons rendre compte ici des divers thèmes proposés. Et, comme d'habitude encore, le résultat est une splendide promenade au pays des Mollusques.

Suivons donc nos habituels et sympathiques guides (ils ne prennent pas une ride ;-) !

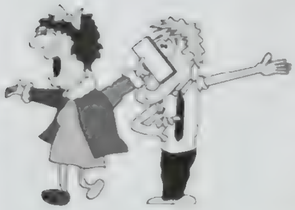
Pour chaque participant, des photos …


et un article si ce participant a souhaité commenter son sujet !

Expo 2007

Le genre *Nassarius* Duméril, 1806 en Europe (Atlantique et Méditerranée)

Christiane DELONGUEVILLE & Roland SCAILLET



La Famille des Nassariidae comprend plusieurs genres dont un a été illustré à l'occasion de l'exposition 2007. Il s'agissait de mettre en évidence les espèces du genre *Nassarius* Duméril, 1806 établies sur la façade atlantique de l'Europe et en Méditerranée. Celles-ci sont au nombre de 28 comme mentionné dans la banque de données des mollusques marins européens du Muséum d'Histoire Naturelle de Paris (www.somali.asso.fr/clemam/index.clemam.html).

23 des espèces illustrées étaient en provenance de notre collection, 4 autres étaient représentées par une iconographie issue de la littérature. *Nassarius robustus* n'a pu être illustré par manque de représentation récente.

Les représentants du genre *Nassarius* sont des espèces qui se nourrissent principalement de cadavres dont ils identifient la présence par un sens olfactif particulièrement développé (présence d'un organe sensoriel - l'osphradium - à la base du siphon). Ils vivent enfouis dans le sable ou dans la boue dont ils s'extraient rapidement lorsqu'ils localisent la présence d'une charogne.

Le tableau ci-dessous donne une indication de la distribution principale des espèces de *Nassarius* en Europe :

- Quelques unes sont largement distribuées en Atlantique et/ou en Méditerranée (colonne 1).
- Certaines sont concentrées en mer d'Alboran et dans le proche Atlantique (colonne 2).
- D'autres sont confinées dans la Méditerranée orientale (colonne 3). L'une d'elles, en provenance de la mer Rouge, a atteint la Méditerranée par le canal de Suez et se récolte aujourd'hui sur les côtes d'Egypte (*N. arcularius plicatus*).
- Enfin, deux espèces sont décrites dans des zones spécifiques, il s'agit de *N. tinei*, dans les lacs d'eau saumâtre aux environs de Messine (Sicile) et de *N. robustus* en Adriatique.

Les *Nassarius* sont de petits gastéropodes, en conséquence de nombreux spécimens de chaque espèce ont été exposés. Un diaporama avec représentation photographique des espèces a défilé sur un écran d'ordinateur durant toute la durée de l'exposition. En conclusion, cette présentation était l'occasion d'admirer, en un coup d'œil et dans un même espace, de petites coquilles rarement mises en évidence lors d'expositions de mollusques marins.

Espèces	1	2	3
Nassarius arcularius plicatus (Röding, 1798)			x
Nassarius circumcinctus (Adams A., 1852)			x
Nassarius coralligenus (Pallary, 1900)		x	
Nassarius corniculum (Olivi, 1792)	x		
Nassarius cuvierii (Payraudeau, 1826)	x		
Nassarius denticulatus (Adams A., 1852)		x	
Nassarius elatus (Gould, 1845)		x	
Nassarius frigens (Martens, 1878)		x	
Nassarius gibbosulus (Linnaeus, 1758)			x
Nassarius granum (Lamarck, 1822)	x		
Nassarius heynemanni (Maltzan, 1884)		x	
Nassarius incrassatus (Ström, 1768)	x		
Nassarius johni (Monterosato, 1889)		x	
Nassarius lima (Dillwyn, 1817)	x		
Nassarius louisi (Pallary, 1912)			x
Nassarius macrodon recidivus (Martens, 1876)		x	
Nassarius mutabilis (Linnaeus, 1758)	x		
Nassarius nitidus (Jeffreys, 1867)	x		
Nassarius ovoideus (Locard, 1886)		x	
Nassarius pfeifferi (Philippi, 1844)		x	
Nassarius pygmaeus (Lamarck, 1822)	x		
Nassarius reticulatus (Linnaeus, 1758)	x		
Nassarius robustus (Monterosato 1890)			
Nassarius tinei (Maravigna in Guérin, 1840)			
Nassarius tingitanus (Pallary, 1901)		x	
Nassarius turulosus (Risso, 1826)			x
Nassarius unifasciatus (Kiener, 1834)	x		
Nassarius vaucheri (Pallary, 1906)		x	

Expo 2007

Pour le plaisir des yeux : *Hexaplex cichoreum*

Roland HOUART

Hexaplex cichoreum (Gmelin, 1791) : une espèce polymorphe

Hexaplex cichoreum est un Muricidae, très commun, dont la taille moyenne varie entre 70 et 130 mm et qui connaît un grand nombre de synonymes, notamment à cause de la morphologie très variable de la coquille.

Cette espèce peut se présenter sous différentes formes. Les épines d'abord: celles-ci peuvent être quasi inexistantes, petites ou grandes, foliacées ou presque lisses, droites ou recourbées. La spire est d'une hauteur variable. Le nombre de varices varie entre 5 et 9 sur le dernier tour, étroites ou larges, basses ou élevées. Le canal siphonal est parfois court et large, parfois long et plus étroit.

La coquille peut également arborer différents coloris, allant du blanc intégral au brun foncé, quasi noir, en passant par toutes les gammes de coloris: uniformes, bandes alternées blanches et brunes.

La forme déprimée, pour laquelle le nom *Murex depressospinosus* a été créé n'est pas non plus dénuée d'intérêt.

Il existe également une forme senestre dont je ne possède malheureusement pas d'exemplaire mais qui peut être admirée sur divers sites internet.

L'espèce vit surtout aux Philippines mais est également présente dans d'autres régions d'Indonésie telle la Papouasie Nouvelle-Guinée, Sumatra, et les Moluques.

SBM 13.01.2007
CEBU, PHILIPPINES

La synonymie complète est présentée ci-dessous:

Hexaplex cichoreum (Gmelin, 1791) **(espèce type du genre *Hexaplex*)**
Murex cichoreum Gmelin, 1791 : 3530; ref. to Argenville, pl. 16, fig. K
= *Murex diaphanus* Gmelin, 1791
= *Murex fasciatus* Gmelin, 1791
= *Hexaplex foliacea* Perry, 1811
= *Murex endivia* Lamarck, 1822
= *Murex saxicola* Broderip, 1825
= *Murex radicula* Menke, 1828
= *Murex depressospinosus* Dunker, 1869
= *Murex endivia* var. *albicans* Tryon, 1880

Quelques mollusques terrestres "exotiques"

Claude VILVENS

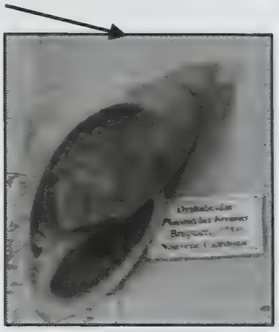
Non, pas de Trochidae ;-)

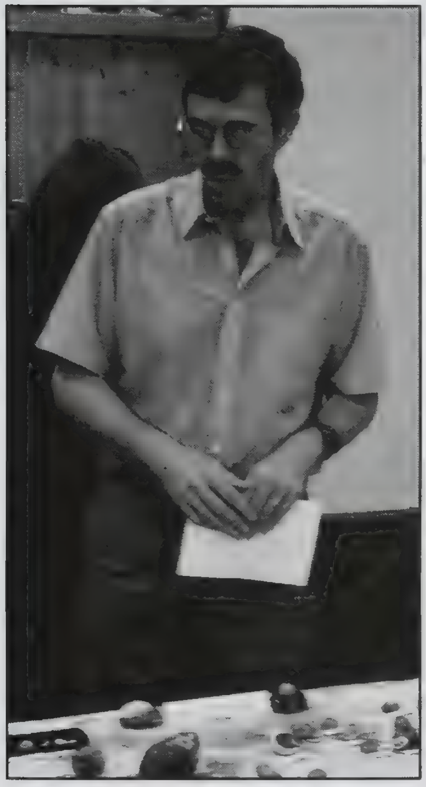
Les Mollusques Terrestres sont, quand on y pense, bien plus proches de nous autres humains que les Marins, puisque nous respirons le même air et que nous mangeons les mêmes végétaux (enfin, nous, c'est de la salade plutôt ;-)). Si nous ne faisons souvent plus guère attention à nos escargots de jardin (mais je vais y revenir), nous sommes par contre beaucoup plus sensibles à la beauté des Terrestres "exotiques", donc asiatiques, africains ou américains, et, plus particulièrement encore, ce sont les espèces tropicales qui nous attirent le plus par leurs couleurs, leur taille, leur forme parfois si surprenante. Ont donc été présentées ici sur une carte du monde un échantillon d'espèces terrestres issues d'un peu partout :

Acavidae		
Acavus haemastoma	(Linné, 1758)	Sri Lanka
Clavator obtusatus	(Gmelin, 1790)	Madagascar
Helicophanta ibaraoensis	Angas, 1879	Madagascar
Pedinogyra hayii	(Griffith & Pidgeon, 1833)	Australie
Pedinogyra hayii	(Griffith & Pidgeon,1833)	Australie
Achatinidae		
Achatina fulica	(Bowdich, 1822)	Laos
Achatina granulata	Krauss	Congo
Archachatina ventricosa	(Gould, 1850)	Sierra Leone
Ariophantidae		
Asperitas trochus	(Müller, 1774)	Indonésie
Bradybaenidae		
Calocochlia pan	(Broderip, 1841)	Philippines
Chrysalis caniceps	Bartsch, 1932	Philippines
Euhadra intersting	Kobelt, 18??	Japon
Euhadra quaesita	(Deshayes, 1851)	Japon
Euplecta biserialis	?	Laos
Helicostyla grandis	(Pfeiffer, 1845)	Philippines
Helicostyla lignaria	(Pfeiffer, 1842)	Philippines
Camaenidae		
Amphidromus perversus	(Linné, 1758)	Indonésie
Caracolus sagemon	Beck, 1837	Jamaïque
Labyrinthus otis orthorhinus	Pilsbry, ?	Panama
Papustyla pulcherrima	Rensch, 1931	Papouasie - Nouvelle Guinée
Papustyla xanthochila	(Pfeiffer, 1861)	Iles Salomon

Pleurodonte excellens	(Pfeiffer, 1852)	Rép. dominicaine
Pleurodonte marginella	(Gmelin, 1790)	Puerto Rico
Thersites palmensis	(Brazier, 1876)	Australie
Thersites) bloomfieldi	(Cox, 1864)	Australie
Cyclophoridae		
Cyclophorus arthriticus	Theobald, 1864	Thaïlande
Helicarionidae		
Ryssota otaheitana	(Férussac, 1821)	Philippines
Helicidae		
Arianta arbustorum	(Linné, 1758)	France
Cepaea nemoralis	(Linné, 1758)	Belgique
Helicella itala	(Linné, 1758)	France
Helix aspersa	Müller, 1774	France
Helminthoglyptidae		
Polymita picta	(Born, 1778)	Cuba
Megalobulimidae		
Megalobulimus oblongus	(Müller, 1774)	Uruguay
Orthalicidae		
Liguus virgineus	(Linné, 1767)	Haïti
Placostylus bovinus	(Bruguière, 1789)	Nouvelle Calédonie
Partulidae		
Cerion mumia	Pilsbry & Vanata, 1896	Cuba
Pomatiasidae		
Pomatias elegans	(O.F.Müller, 1774)	Belgique
Tropidophora coquandiana	Petit, 1852	Madagascar
Tropidophora moulinsi	(Grateloup, 1840)	Madagascar
Tropidophora occlusa	Mörch, 1852	Madagascar
Tropidophora tricarinata	(Sowerby, 1843)	Madagascar
Strophocheilidae		
Chiliborus chilensis	Sowerby, 1833	Chili
Strophocheilus musculus	Bequaert, 1948	Uruguay
Strophocheilus pudicus	Müller, 1774	Brésil
Viviparidae		
Campeloma decisum	Say, 1817	U.S.A.

Helminthoglyptidae
Polymita picta
(Born, 1778)
Cuba





On remarquera que si les familles sont citées, on est resté muet quant aux groupes taxonomiques supérieurs (classes, sous-classes, super-ordres, ordres, sous-ordres, infra-ordres, super-familles, tribus, etc) car, en fait, les auteurs sont très loin d'être d'accord entre eux et tenter d'établir un tableau systématique sur lequel tout le monde s'accorderait semble fort délicat à l'heure actuelle.

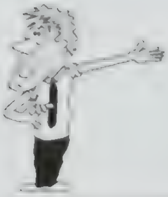
Mais il y a autre chose … Le lecteur attentif aura remarqué que certaines espèces lui disent quelque chose ;-), du moins si il se livre à la malacologie de terrain en Belgique : *Pomatias elegans* ou *Cepaea nemoralis* (j'avais bien dit qu'on y revendrait). Mais ce ne sont pas des Terrestres exotiques ?? Pour nous, non, mais pour un Japonais ou un Brésilien, si ! Les publications reçues à la SBM le montrent d'ailleurs périodiquement avec des articles écrits hors Europe sur des espèces qui nous sont bien connues. Donc, à méditer :

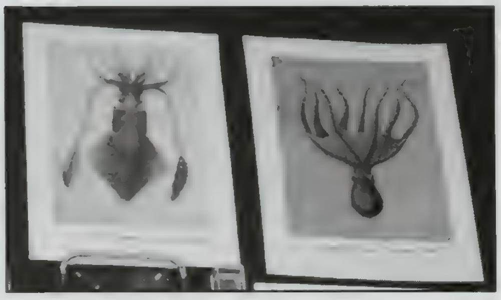
On est toujours l'exotique de quelqu'un …

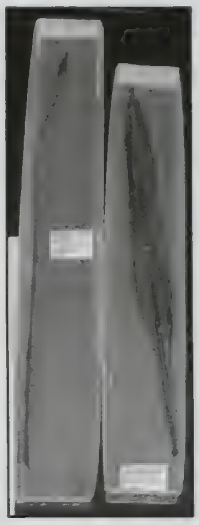
Expo 2007

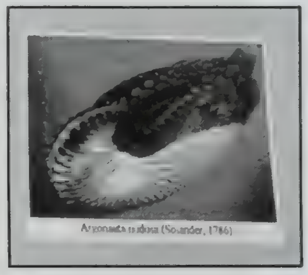
Le phénomène d'évolution dans la classe des Céphalopodes

Ralph DUCHAMPS



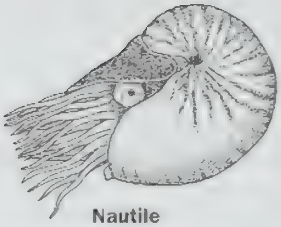




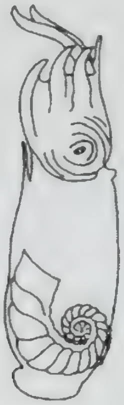


– **L'évolution de la coquille.**

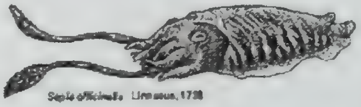
L'évolution se remarque plus facilement en examinant visuellement les modifications intervenues dans différents genres. L'exemple le plus caractéristique chez les Céphalopodes, c'est la coquille.



Nautile
Nautilus macromphalus
Sowerby, 1849

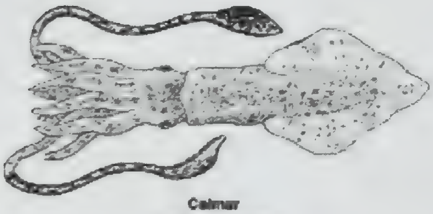


Spirula spirula
(Linnaeus, 1758)

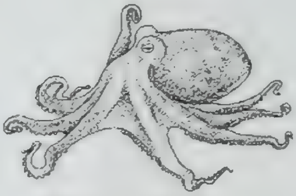


Sepia officinalis Linnaeus, 1758

← céphalopode ectocochléen → ← céphalopodes endocochléen →
← coquilles cloisonnées et possédant un siphon →
← céphalopode sans coquille,
mais avec un sépion →



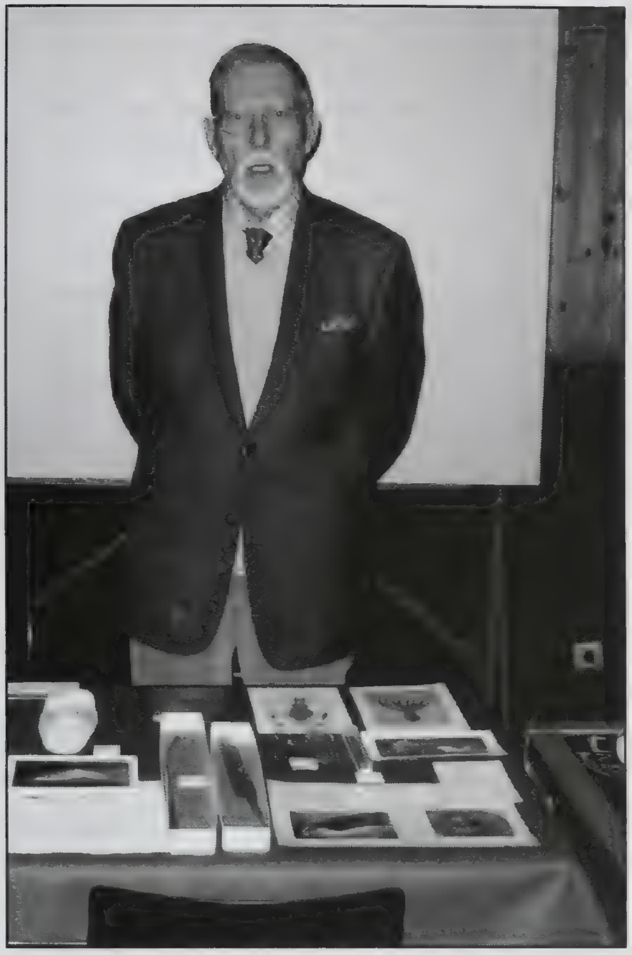
Calmar
Loligo vulgaris
Lamarck, 1798



Poulpe commun
Octopus vulgaris
Lamarck, 1798

← céphalopode sans coquille,
mais avec un gladius →

← céphalopode sans coquille →



L'évolution basée sur une coquille relativement compliquée, qui se présente sous la forme d'une spirale plane involute de plusieurs tours et divisée intérieurement par des chambres cloisonnées. Ces cloisons ou septa sont de forme concave et laissent en leur centre, le passage d'un siphon. Il s'agit du genre *Nautilus*.

Le second genre de céphalopode cloisonné avec siphon, c'est la *Spirula* dont la coquille est interne et ne représente que 8% du volume de l'animal.

Le troisième genre est très différent dans le sens où il ne possède pas de coquille, mais un sépion interne avec un siphon différent par rapport aux précédents. Il s'agit de la seiche (*Sepia*)

– **Un problème de flottabilité.**

L'évolution de la coquille va de pair avec la résolution d'un problème de flottabilité. Celle-ci a été longtemps considérée comme acquise, grâce à un système d'équilibre hydrostatique. Il est basé sur le fait d'ajouter ou d'éliminer du liquide présent dans les chambres. C'est exact dans le genre *Spirula* mais pas chez *Nautilus*. Pourquoi ? Parce que chez l'animal mature, le poids total du nautile (partie molle + coquille) est quasiment égal à celui de l'eau de mer et même plutôt plus élevé. D'où une flottabilité légèrement négative. Notons cependant que cette flottabilité est positive chez les jeunes nautiles, afin de les maintenir en profondeur. Le nautile joue sur un équilibre en régulant le contenu du gaz et du liquide. L'eau est expulsée des chambres en la pompant au travers de l'ectosiphon. On peut imaginer raisonnablement que le liquide peut circuler dans les deux sens. Pour contrôler la flottabilité il faut soit augmenter, soit diminuer le poids.

– **Flottabilité & locomotion.**

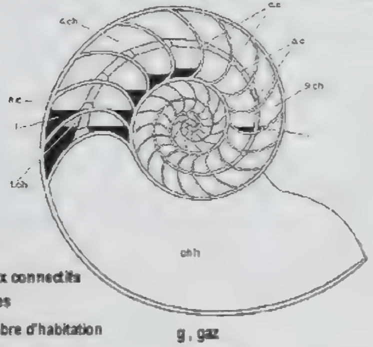
Pour les céphalopodes à coquille cloisonnée et possédant un siphon, la flottabilité est assurée grâce à un contrôle du liquide et du gaz contenu dans les chambres. Ce procédé se rencontre chez les nautiles, la spirule et les seiches.

– **Le Nautilus.**

La coquille du nautile adulte a une fonction double : la protection et la flottabilité. Cette dernière grâce à un appareil hydrostatique. Comparé aux deux autres genres, les chambres sont vastes, environ 20 ml, les cloisons sont espacées et le siphon mesure au moins 30 cm ; 80% du volume des chambres est occupé par du gaz, afin de compenser le poids propre de la coquille dans l'eau de mer. La plus grande quantité de liquide se trouve dans la chambre la plus récente. La quantité de liquide diminue jusqu'à la 7è chambre. La variation de la flottabilité s'effectue grâce à un système de pompe osmotique.

Mécanisme hydrostatique

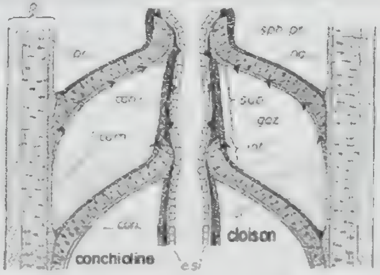
Distribution du liquide (noir) **Distribution du gaz (blanc)**



a. c, anneaux connectifs
ch, chambres
ch h, chambre d'habitation
c. s, cols septaux
g, gaz
l, liquide

(d'après Denton et al. 1966)

Acheminement du liquide caméral vers la partie perméable du siphon



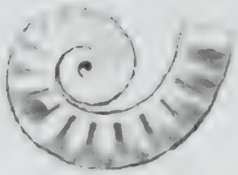
con i., couche interne de conchioline
e. si., épithélium siphonculaire
inf. partie inférieure du siphon
l. cam., liquide caméral
na., couche nacrée
p., paroi de la coquille
pr., couche prismatique
sph. pr., couche sphérulitique prismatique
sup., partie supérieure du siphon

(d'après Mutvel, 1964)

– **La Spirula.**

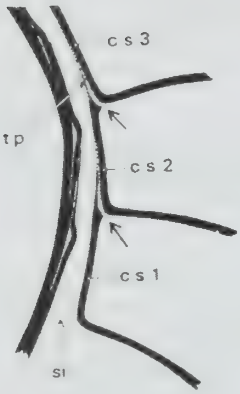
La coquille interne est petite et comporte plus de chambres (30 à 35) que chez le nautile. Un peu de liquide est présent dans les trois chambres les plus récentes. De la 4è à la 20è chambre on ne décèle que du gaz. Les chambres les plus anciennes sont remplies de liquide. Chez les jeunes individus, toutes les chambres sont sèches, sauf la plus récente. La spirule se déplace énormément, le jour entre – 600 et 700 m, mais cette espèce peut descendre jusqu'à – 1200 m. La nuit, l'animal remonte à un niveau vers les – 200 à 300m.

Une nouvelle chambre comporte un liquide isotonique à l'eau de mer et est sécrété dans l'espace ainsi créé. La chambre est ensuite fermée par une cloison en forme de coupole. Lorsque la chambre nouvelle est suffisamment solide pour résister à la pression hydrostatique, du sel en est extrait et le liquide devient fortement hypotonique (jusqu'à 1/5è de la valeur initiale). Une bulle de gaz se forme et le liquide est progressivement remplacé par du gaz. Lorsqu'une nouvelle chambre est totalement achevée la précédente ne contient presque plus de liquide. Au fur et à mesure que les chambres deviennent plus anciennes, elles se remplissent à nouveau de liquide dont l'osmolarité est beaucoup plus basse que celle de l'eau de mer. Graduellement elles deviennent isotoniques.



Spirula spirula **(Linnaeus, 1758)**
coupe sagittale

Spirula spirula _ chambres et siphon



Spirula coupe médiane du siphon.

Premières chambres

c.s. 1, 2, 3 cols septaux des chambres

si siphon

t. p. tube poreux, lieu du drainage du liquide caméral

(d'après Denton et al. , 1967).

L'échange du liquide s'effectue par une zone perméable des cols septaux. Le liquide va vers la partie haute du siphon, par la cuticule mince qui recouvre la face interne des chambres et des cols septaux qui fait fonction de buvard. La position normale de nage s'effectue tête en bas. La pression du gaz dans la coquille est inférieure à 1 atmosphère. La coquille peut résister à une pression hydrostatique d'environ 170 atm. (130-230)

– **La seiche. (Sepia)**

Comme pour le nautile et la spirule, la seiche comporte une partie molle et une sorte de coquille modifiée, interne et nommée sépion. Si l'on enlève le sépion, la seiche a une densité supérieure de 4% à l'eau de mer (1, 026). D'autre part, le sépion représente environ 9% du volume de l'animal. Pour ne pas se retrouver au fond de la mer, la seiche doit compenser l'excès de poids. Pour une flottabilité neutre, la densité de la coquille doit passer à 0,62. Cela signifie que le contenu de liquide dans le sépion doit être ramené à un peu moins de 30%. Pour un volume de sépion de par exemple 100ml, le volume de matière sèche est de 16ml et le poids de 36 gr. Dans cette même hypothèse, mais concernant le liquide, le volume est de 31 ml, pour un poids de 32 gr. Enfin pour le gaz, le volume sera de 53 ml avec un poids insignifiant. Une remarque s'impose, toutes les chambres n'ont pas un volume identique, et le contenant est également différent. La chambre la plus récente ne contient que du liquide (volume de 1 à 2 ml) et est isotonique au sang de l'animal et à l'eau de mer ; c.à.d. qu'ils ont une même concentration moléculaire. La 2è chambre contient un peu de liquide et les 3è à 10è chambres _ qui occupent la partie centrale de l'animal _ ne renferment que du gaz. Les chambres plus anciennes, sont plus petites et sont remplies uniquement de gaz. Par contre, les chambres intermédiaires sont remplies à la fois de gaz et de liquide. Elles sont situées dans la partie ventrale de la seiche, en contact avec l'épithélium siphonculaire.

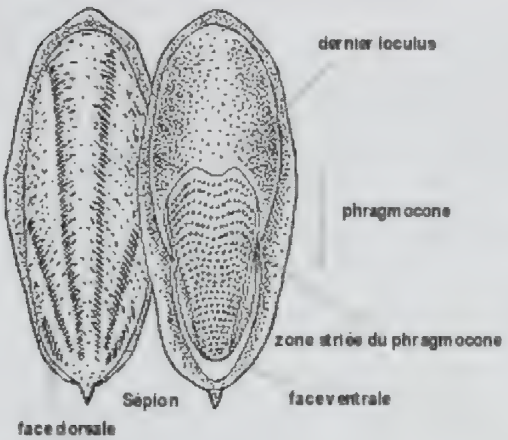
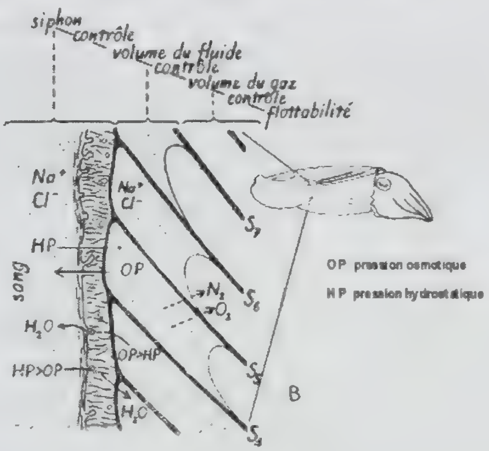


Schéma d'une partie du sépion montrant le mécanisme hydrostatique

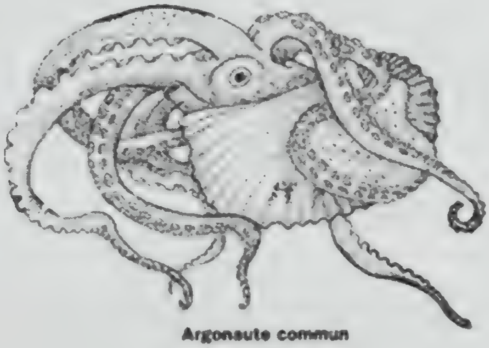


Les parois entre chambres sont totalement étanches. Quand la construction d'une chambre est achevée, le liquide en est extrait au travers de la membrane siphonculaire, et ce à partir du moment où cette chambre est capable de supporter la pression hydrostatique. Le gaz entre lentement par diffusion dans l'espace vide. Dans la chambre la plus récente la pression du gaz est de 0,2 atm. La valeur moyenne étant de 0,8 atm. celle-ci n'est atteinte qu'à partir de la 9è chambre (donc très inférieure à 1 atm). Il faut plus d'un mois pour qu'un équilibre s'installe entre l'azote présent dans le tissu vivant et celui contenu dans les chambres.

Lorsque la pression hydrostatique est plus importante que la pression osmotique, l'eau de mer pénètre dans la chambre et comprime le gaz présent. Après extraction des solutés du liquide caméral, principalement du sodium et du chlorure, celui-ci devient hypotonique par rapport au sang (concentration en dessous de celle du sang). L'eau s'écoule de la chambre vers le siphon, puis dans le sang, et est éventuellement éliminée par les reins. Le gradient osmotique entre le sang et le liquide caméral peut jusqu'à un certain point équilibrer 5 des 7 atm. d'une seiche vivant à – 70 m. Plus l'animal vit à une grande profondeur, plus il subit une pression plus importante et plus le gradient est hypotonique pour le liquide des chambres. Toutefois si une seiche va à une profondeur inférieure à – 240 m, la pression hydrostatique est suffisamment forte que pour faire pénétrer le liquide dans les chambres, même si leur osmolarité a atteint la valeur zéro. Le gradient osmotique ne peut plus contrebalancer la force hydrostatique.

– **L'argonaute.**

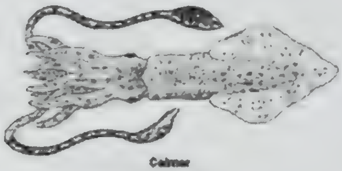
On pourrait s'étonner de ne pas voir figurer l'argonaute parmi les trois genres traités ci - avant, mais ce céphalopode ne possède pas de coquille, seule la femelle occupe une nacelle qui outre l'animal, abrite également les œufs. Les coquilles sont secrétées par le manteau et composées principalement par de l'aragonite, tandis que la nacelle de l'argonaute est composée de calcite et secrétée par une paire de bras.



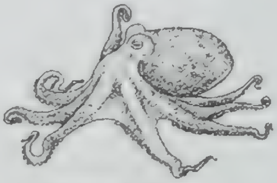
Argonaute commun
Argonauta argo
Linnaeus, 1758

– **Les autres systèmes de flottabilité.**

En dehors des trois genres récents cités ci avant, un grand nombre de familles *Argonautidæ*, *Teuthoidæ* et certains octopodes pélagiques, utilisent un autre système pour diminuer la densité de leur corps et jouir d'une flottabilité neutre. Par exemple l'intégration dans le corps de liquide fait de substances légères. Le système le plus répandu consiste à intégrer dans le coelome ou dans les tissus des ions légers. Notamment un liquide riche en ammonium. L'ammoniaque a également été détectée dans différents tissus. Par exemple, les *Cranchiidæ* élargissent leurs sacs coelomiques de manière à occuper environ les 2/3 du volume de l'animal, ce qui les rends isotoniques à l'eau de mer. Mais le liquide plus acide et les ions de sodium sont remplacés par des ions d'ammonium. Certains octopodes possèdent des muscles peu développés, mais ont une énorme quantité de matière gélatineuse, où les ions sulphate de l'eau de mer sont remplacés par des ions chlorure, ce qui engendre une flottabilité neutre. L'*Ocythoe* qui est un octopode épipélagique, possède au dessus du jabot une chambre remplie de gaz comparable à la vessie natatoire des poissons. D'autres bénéficient de lipides légers ou d'huile accumulés dans la glande digestive. La présence de gaz et d'ions légers accumulés dans le corps sont l'apanage des céphalopodes nageurs peu rapides. La solution apportée pour les nageurs rapides sont leurs forces hydrodynamiques ou forces d'ascensions.

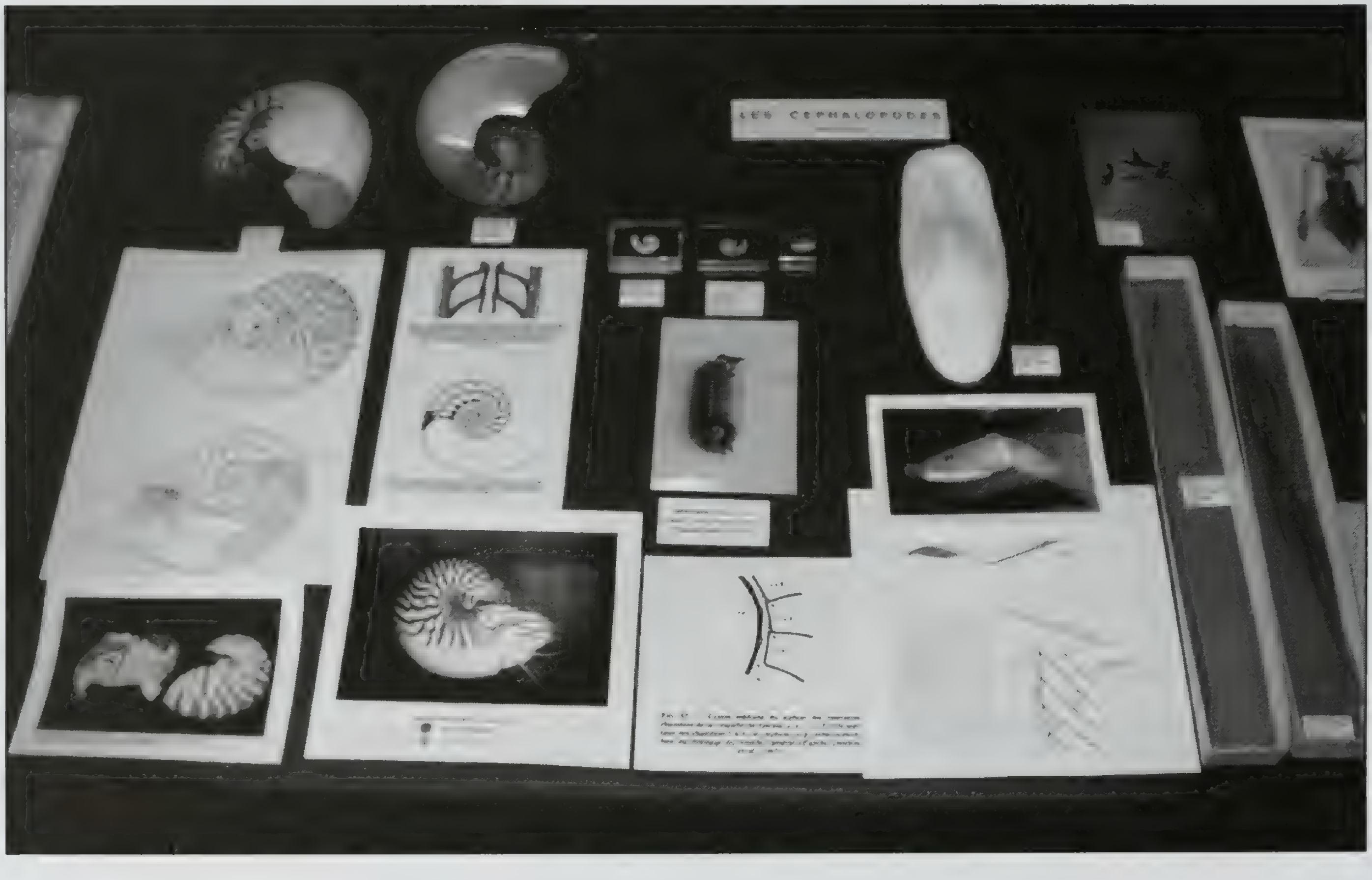


Calmar
Loligo vulgaris
Lamarck 1798



Poulpe commun
Octopus vulgaris
Lamarck, 1798

R. Duchamps.



Expo 2007

La famille des Pholadidae

Annie LANGLEIT

Classification : Pholadidae : (Pholadinae, Martesiinae, Jouannetiinae et Xylophagainae, dont certains font une famille séparée)

Bivalves très évolués, adaptés pour creuser dans les divers substrats où ils vivent, allant de la vase compacte à la pierre, passant par le bois, les racines ligneuses des plantes ou arbres littoraux, les coraux, les autres coquillages et divers déchets immergés. Pour ce faire, ils ont développé une coquille de forme allongée, plus ou moins trigone, bien que fragile, une multitude de pièces accessoires, très diversifiées, calcaires ou non, soudées ou non, d'où il résulte que leur étude est très ardue, sans compter que beaucoup sont de petite taille et fort similaires. Et qu'il faut les débusquer sans dégâts. On y recense des apophyses, des plaques dorsales, divisées ou non et des plaques ventrales, nommées protoplax, mesoplax, metaplax, hypoplax ; ajoutons des condyles, callums, siphonoplax, chondrophores, etc. Renonçons à d'autres détails, mais remarquons que, dans nos collections, forcément, les pièces additives manquent souvent.

Pour creuser, ils utilisent divers procédés, soit une action de râpe en pivotant, soit des sécrétions acides.

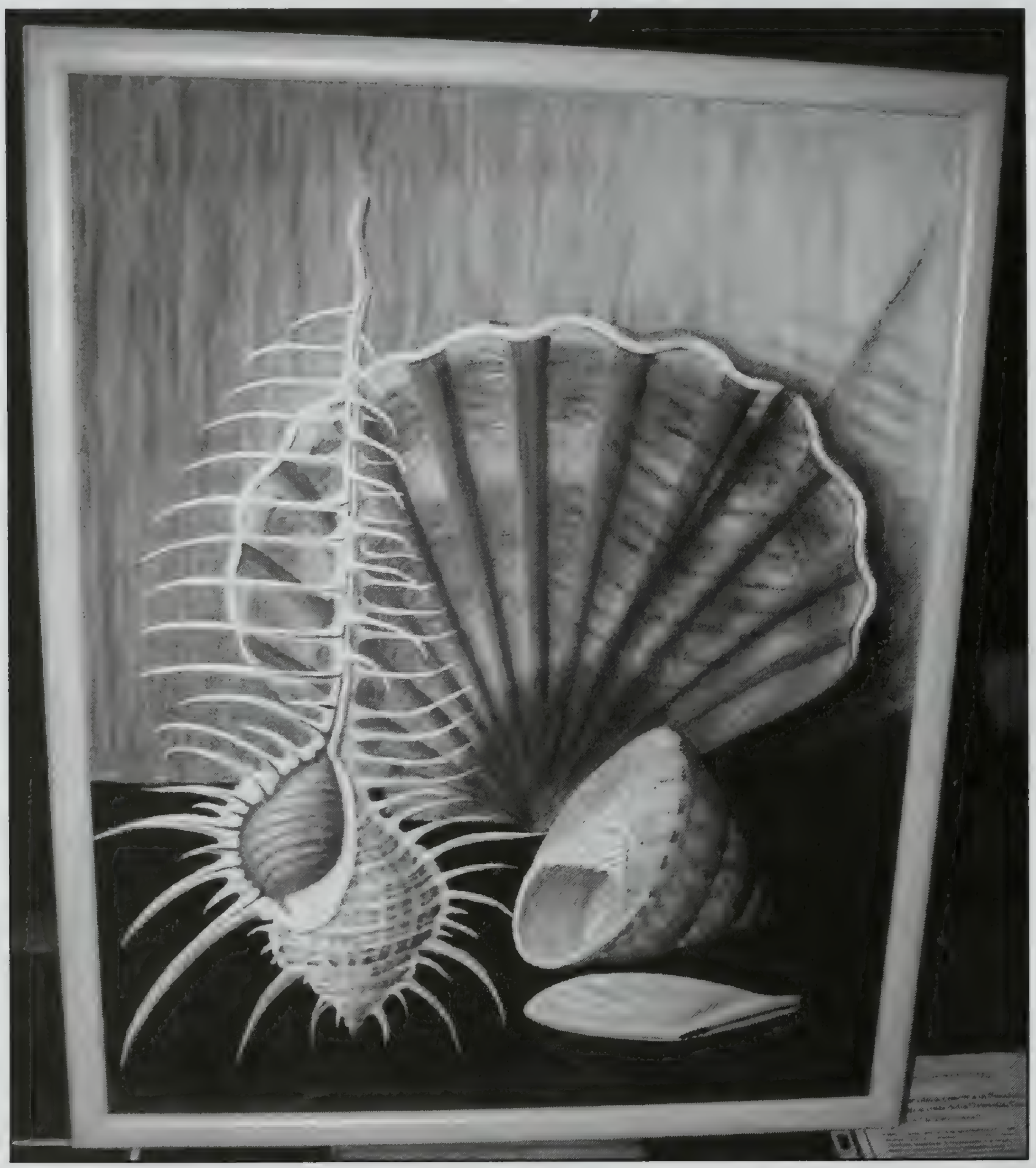
Pour leur classification, la présence ou non de ces divers éléments entre en ligne de compte mais aussi leur capacité à creuser plus ou moins profondément.

Pour essayer de visualiser et comprendre tous ces détails, avec un peu de courage, on peut consulter, par exemple, le « Treatise on Invertebrate Paleontology. Mollusca 6. Bivalvia. Moore, 1969 » pas tout neuf, mais très instructif et détaillé.

Pour les néophytes, remarquons une ressemblance avec certains *Petricola* comme justement, *Petricola pholadiformis*, que l'on trouve échoué sur nos plages ; ce sont des Veneroidea, ils n'ont pas de pièces additives et ils ne ressemblent pas tous aux Pholades.

Pour notre exposition, je me suis limitée à de beaux exemplaires bien connus parmi les Pholadinae, quelques rares exemples d'autres sous-familles et des *Petricola* pour comparaison.

Et en prime, un tableau peint par l'auteur qui a des talents d''artistes (NDLR).



Expo 2007

La famille des Unionidae : une sélection ...

Etienne MEULEMAN

Les Unionidae ont une répartition mondiale et sont très diversifiées dans l'est et la partie centrale du nord de l'Amérique. La coquille est de forme très variable, la région antérieure beaucoup plus courte que la région postérieure. La sculpture des sommets est très variée, parfois peu développée, la charnière est de forme variable, parfois rudimentaire. La famille des Unionidae se divise en plusieurs sous-familles, tribus, et une nombre important de genres. Rien qu'en Amérique du Nord, on dénombre près de 300 espèces réparties en 43 genres, six tribus et deux sous-familles.

Asie
XXIV LES
MOLLUSQUES
D'EAU DOUCE
725 figures
PARIS
Océanie

Les espèces présentées sont une sélection des coquilles présentent dans les cinq continents. On peut découvrir les espèces suivantes :

Pour l'Océanie :

Lortiella froggatti Iredale, 1934	Willare Bridge (Australie)
Pseudodon ouriensis Heimbourg	Quizon (Philippines)
Velesunio wilsoni Lea, 1859	Kallangur (Australie)
Velesunio sentanensis Haas	Boroi (Papouasie)

Pour l'Asie :

Cristaria hercules Mid dendorf, 1847	Rivière Ilistaya (Russie)
Inversidens japonensis Lea, 1839	Ono Hyogo Pref. (Japon)
Lamportula leai	Nha Thrang (Vietnam)
Lampsilis Delphinula Morelet, 1849	(Cambodge)
Lanceolaria oxyrhyncha Martens, 1861	Katada (Japon)
Pilsbryoconcha exilis Lea, 1839	Bangkok (Thaïlande)
Unio schelgeli Shiwa, 1986	Lac Biwa (Japon)
Unio tumidus Philipsson, 1788	Gurjev (Kazakhstan)

Pour l'Afrique :

Caelatura aegyptica Caillaud, 1826	Oaugadougou (Burkina Faso)
Caelatura gaboensis Kuster, 1862	Kinshasa (Zaïre)
Caelatura mweruensis Smith, 1893	Lu Kon Zol Wa (Zaïre)
Caelatura stuhlmanni Von Martens, 1897	Vitshumbi (Zaïre)
Unio durieui Deshayes, 1847	Oued Ida (Maroc)
Unio rhomboideus minor Pallary, 1921	Ras El Ma (Maroc)

Pour l'Amérique :

Actinonaias carinata Barnes, 1823	Barry County (Etats-Unis)
Actinonaias cf. ligamentina	Lawrence County (Etats-Unis)
Alasmidonta marginata Say	Illinois (Etats-Unis)
Anodonta ferrusacianus Lea	Hillsdale (Etats-Unis)
Anodonta grandis grandis Say, 1829	Barry County (Etats-Unis)
Anodontites patagonia Lamarck, 1819	Durazzo (Uruguay)
Diplodon paraeformis Lea, 1860	Goni (Urugay)
Elliptio icterina Conrad, 1834	Nassau County (Etats-Unis)
Fusconaia flava Rafinesque, 1820	Richard County (Etats-Unis)
Glebula rotundata Lamarck, 1819	Harris County (Etats-Unis)
Lampsilis siliquoidea rosacea Barnes	Hillsdale (Etats-Unis)
Lampsilis ventricosa Barnes	Barry County (Etats-Unis)
Lasmigona complanata Barnes, 1823	Owen County (Etats-Unis)
Lasmigona costata Rafinesque, 1831	Illinois (Etats-Unis)
Obliquaria reflexa Rafinesque, 1820	Washington County (Etats-Unis)
Obovaria olivaria Rafinesque	Owen County (Etats-Unis)
Potamilus alata Say, 1817	Washington County (Etats-Unis)
Ptychobranchus fasciolaris Rafinesque,1820	Pickaway County (Etats-Unis)
Quadrula apiculata Say, 1829	Monroe County (Etats-Unis)
Quadrula cylindrica Say, 1817	Lawrence County (Etats-Unis)
Quadrula metanevra Rafinesque	Martin County (Etats-Unis)
Quadrula pustulosa Lea, 1831	Morgan (Etats-Unis)
Quadrula quadrula Rafisnesque, 1820	Lawrence County (Etats-Unis)
Quincuncina infucata Conrad, 1834	Union County (Etats-Unis)
Tritigonia verrucosa Barnes	Posey County (Etats-Unis)
Truncilla truncata Rafinesque, 1927	Lawrence County (Etats-Unis)

Pour l'Europe :

Anodonta cygnea Linné, 1758	Mons (Belgique)
Unio crassus Philipsson, 1788	Jambes (Belgique)
Unio pictorium Linné, 1758	Hellevoert (Pays-Bas)
Unio tumidus Philipsson, 1788	Feld am See (Autriche)

Europe
Amérique
Afr

Expo 2007

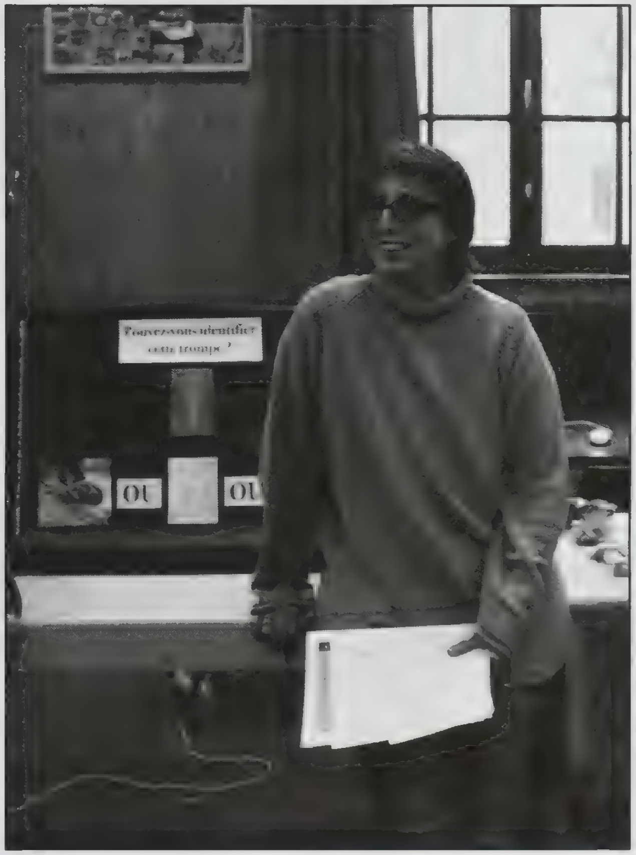
Pterotrachea coronata Forskål, 1775

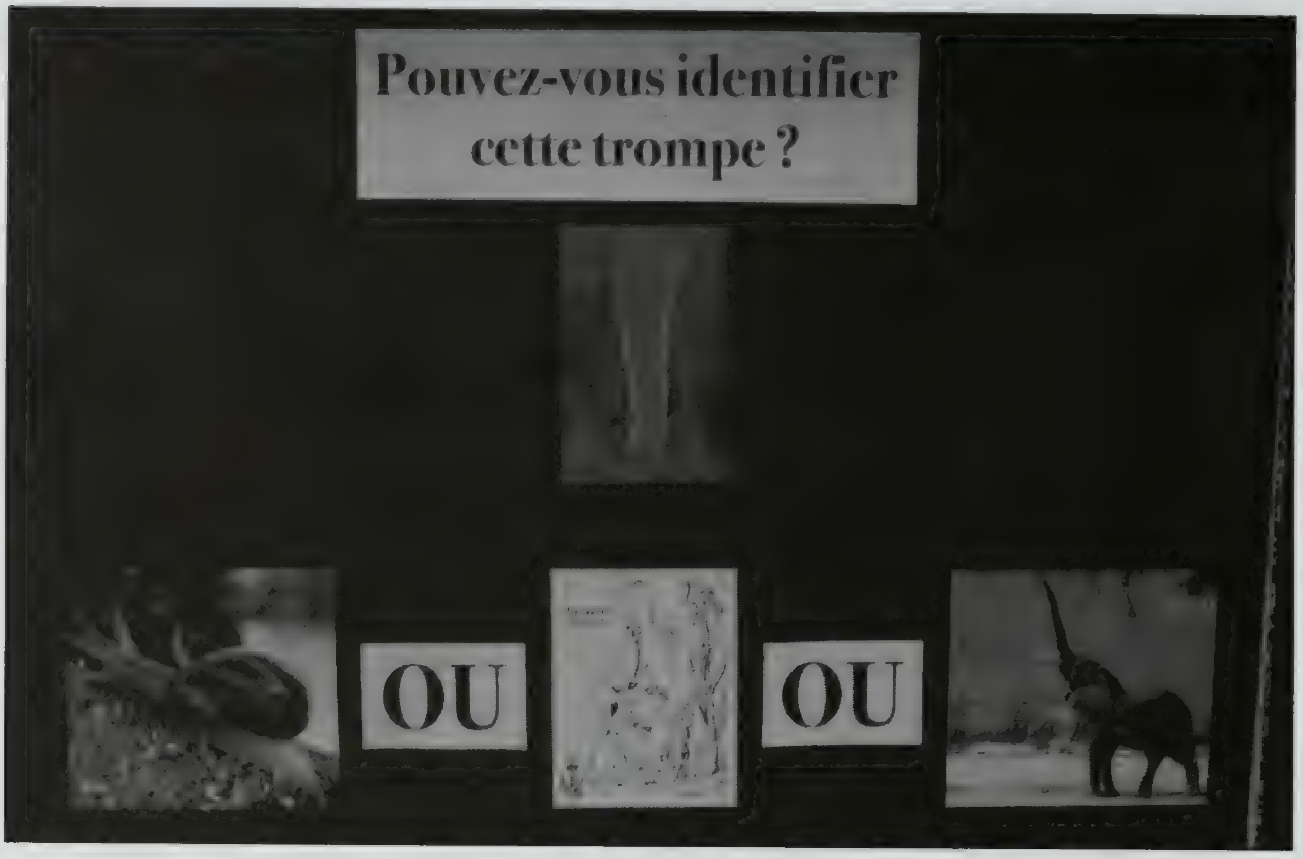
Sophie VALTAT

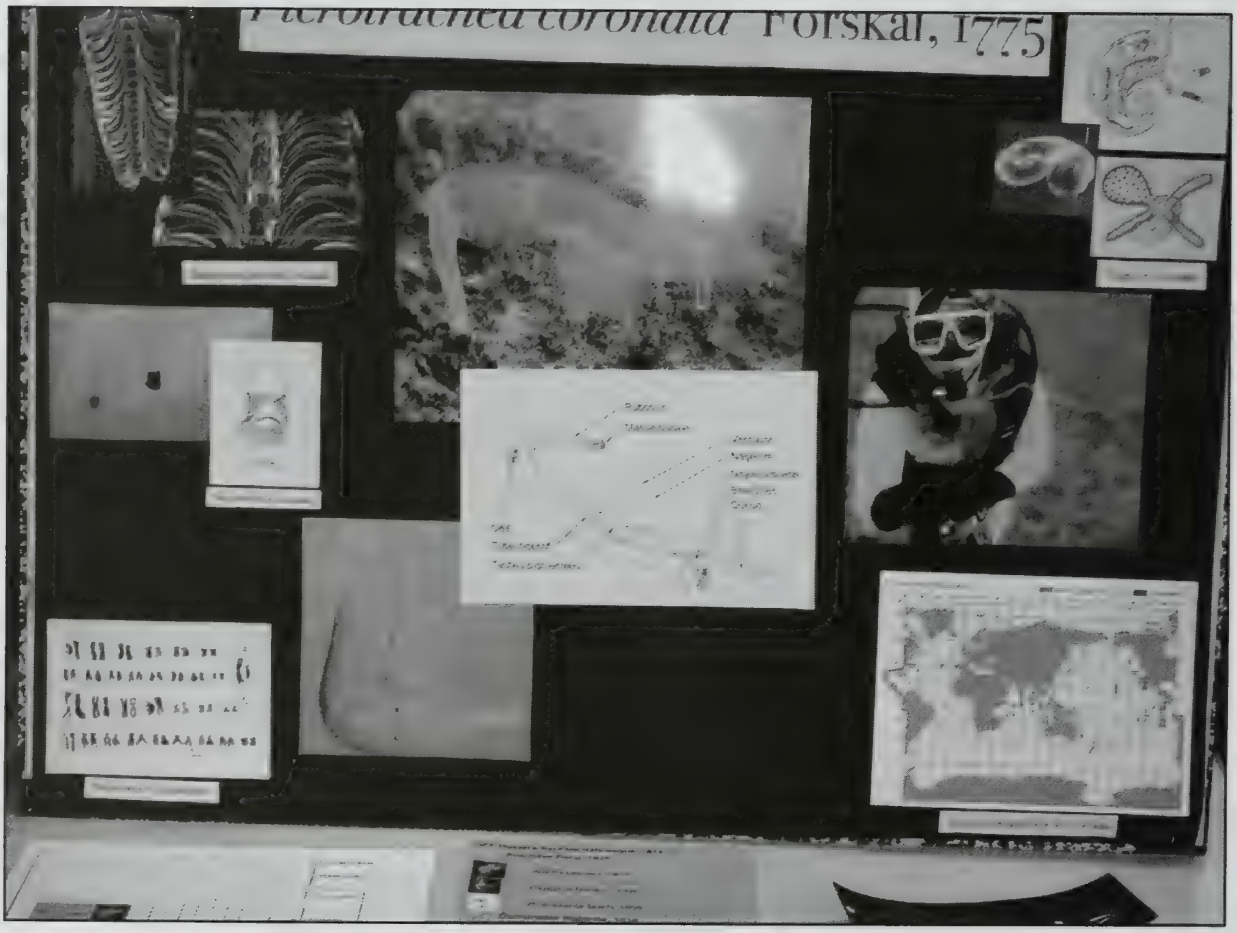
Pterotrachea coronata Forskål, 1775 est un gastéropode pélagique de la superfamille des Pterotracheoidea Rafinesque, 1814, qu'on nomme également les hétéropodes.

Les hétéropodes comprennent trois familles :
- les Atlantidae Rang, 1829 qui possèdent une coquille spiralée à l'état adulte, on les considère comme les moins évolués des hétéropodes,
- les Carinariidae Blainville, 1818 possèdent également une coquille, mais trop petite pour que le corps de l'animal puisse se rétracter complètement à l'intérieur,
- les Pterotracheidae Rafinesque, 1814, qui ne possèdent plus de coquille qu'à l'état larvaire.

A défaut de coquille, c'est une video de *Pterotrachea coronata* Forskål, 1775 prise par Walter Jung sur les côtes espagnoles à faible profondeur qui nous a permis d'admirer cet "étonnant éléphant de mer".
Si vous souhaitez en admirer *P. coronata* et en connaître plus : http://www.valtat.org/pelagic/p_coronata.html.



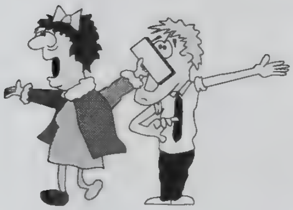

Pouvez-vous identifier cette trompe ?
OU
OU

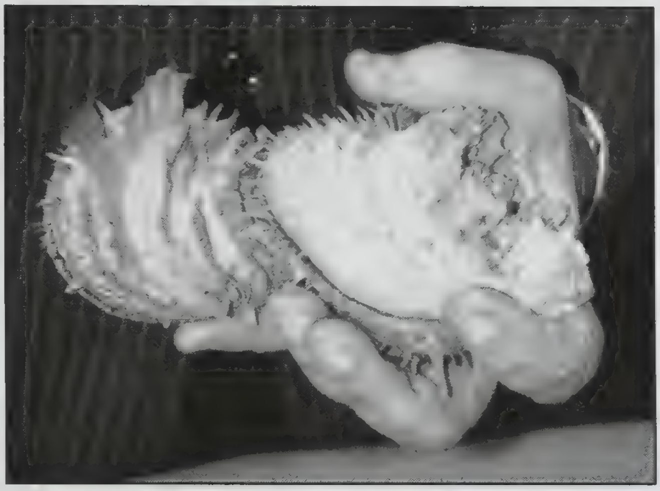

Pterotrachea coronata Forskal, 1775

Expo 2007

Quelques Spondyles

Jacques et Rita SENDERS





Cette famille de bivalves est appréciée des collectionneurs, à l'instar des Pectinidae. Elle comporte une soixantaine d'espèces recensées.

Les spondyles nécessitent très souvent un nettoyage délicat des valves et des nombreuses épines qui les couvrent. Ce sont les plongeurs, avec bouteilles d'air comprimé (Scuba), qui ramènent les plus beaux exemplaires. Les spondyles les plus facilement accessibles se récoltent sur fond meuble: sable et boue. Les valves inférieures sont alors couvertes de voiles qui remplacent les épines et qui ancrent la coquille sur le fond marin. Il est évident qu'il est difficile d'obtenir un spécimen parfait à partir de dragage ou de filets genre "tangle nets".

La couleur joue également un rôle important dans la rareté et donc le prix de certains spécimens.

Le *Spondylus americanus* est recherché pour son abondance, la grandeur de ses valves, la variété de ses couleurs et la fait que plusieurs spécimens peuvent former un ensemble magnifique. Nous avons conservé quelques semaines un amas ("cluster") de 27 belles coquilles que nous avons dû abandonner par manque d'une place assez grande dans nos vitrines...

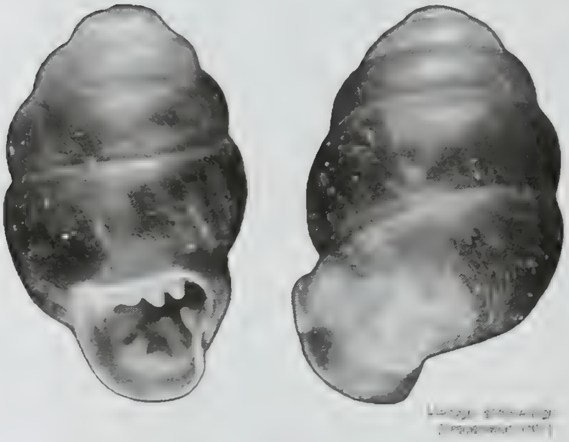
Un autre spondyle très recherché: le *Spondylus lingaefelis* dont les très nombreuses épines lui ont donné le nom. Heureusement pour les amateurs de chats, la langue de leurs petits amis à quatre pattes est autrement douce que le contact du coquillage. Là aussi la couleur joue un grand rôle dans la rareté de cette espèce: le jaune est le plus recherché, viennent ensuite les blancs et les brun-orange. Les coquilles originaires des Philippines sont pratiquement dépourvues d'épines tandis que les plus belles proviennent d'Hawaii et des îles Salomons.

Expo 2007

La plus petite vitrine d'une grande exposition…

Edgar WAIENGNIER

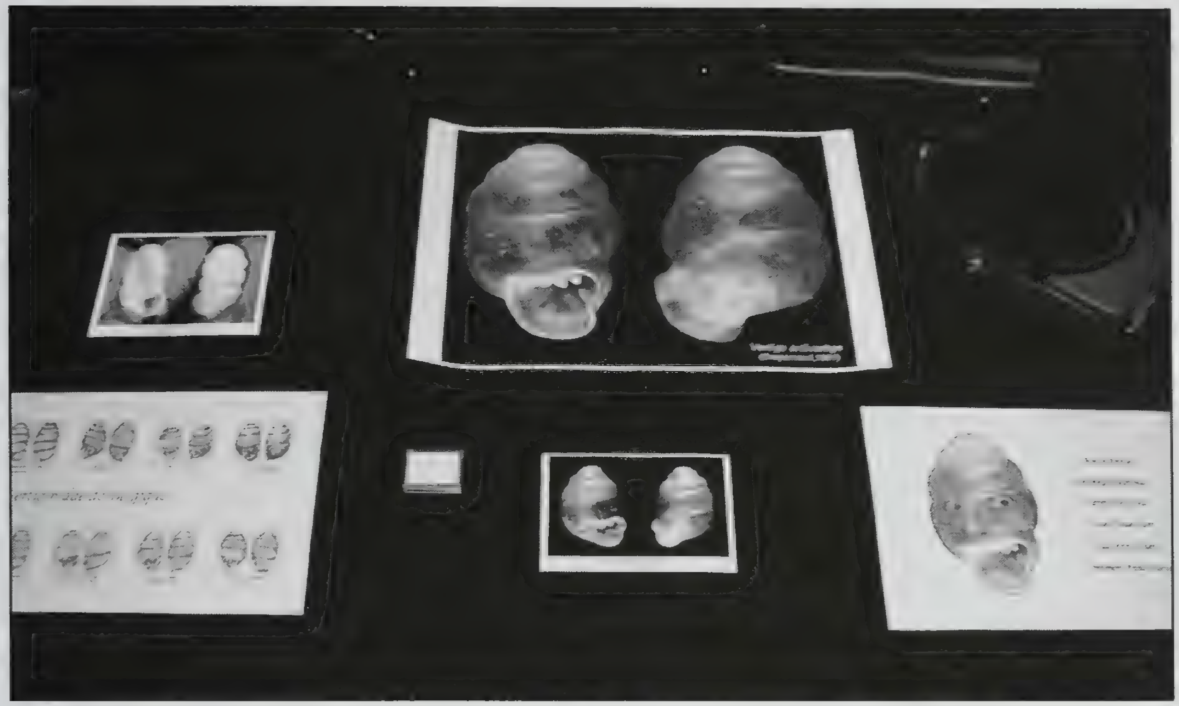
Et… la plus complète ! Il fallait le faire ! Réunir tous les **Vertiginidae** de Belgique ? Oui c'était possible.



Pour rappel, il y a en Belgique trois genres de cette famille, à savoir : ***Columella*** (1 sp.), ***Truncatellina*** (1 sp., et ***Vertigo*** (6 sp.).

Heureusement une bonne loupe, de bons dessins et de bonnes photos étaient à disposition. La plus grande coquille faisant quand même 2,4 mm ! Et la vitrine 30 x 40 mm !

Les photos du Muséum de Genève permirent aux myopes de « voir » de vraies coquilles.

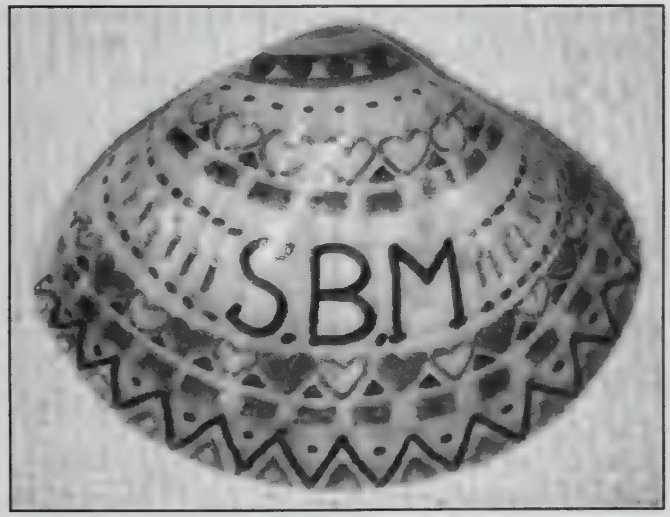


Expo 2007

Des bijoux venus de la mer

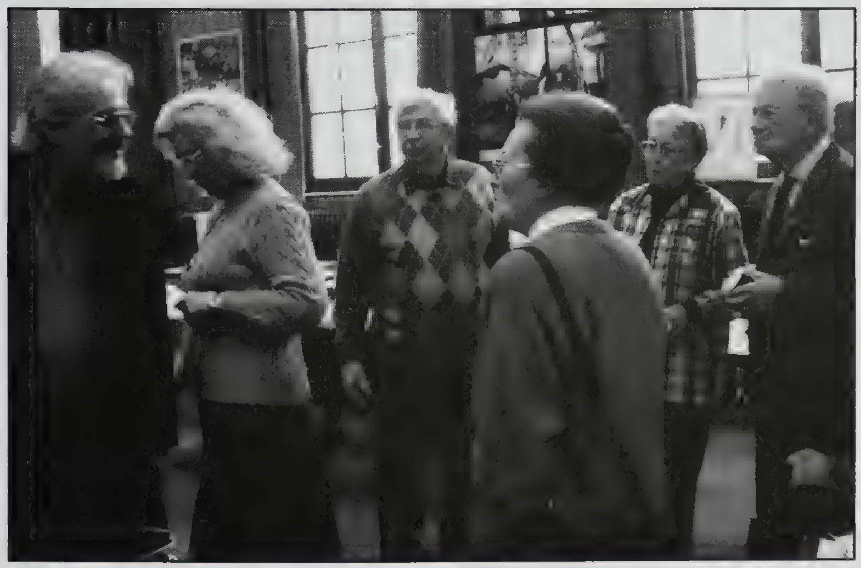
Simone MAENHAUT

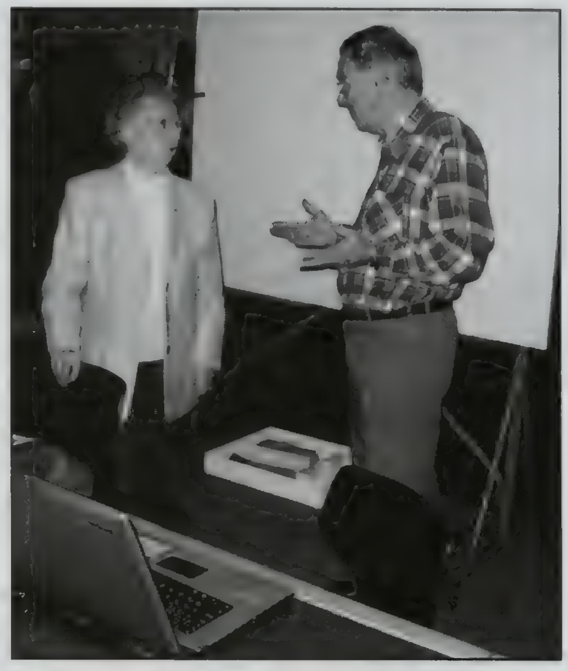
Une tradition des pays de l'est est celle des œufs décorés avec des couches de cire. Simone s'est procuré le matériel nécessaire pour de genre de décorations sur œuf puis s'est dit que si cela fonctionnait sur des œufs, cela devait fonctionner sur des coquilles … Quelle réussite ☺ !

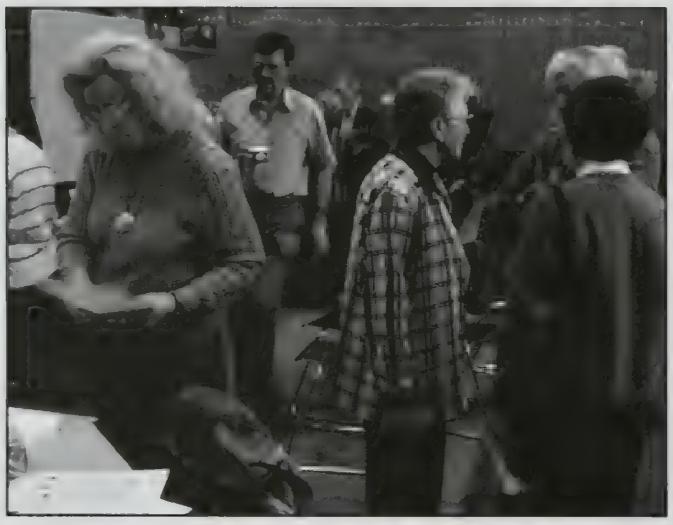


SBM

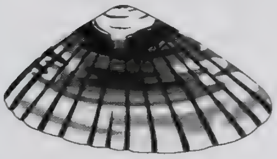
Exposition de la SBM
Janvier 2007







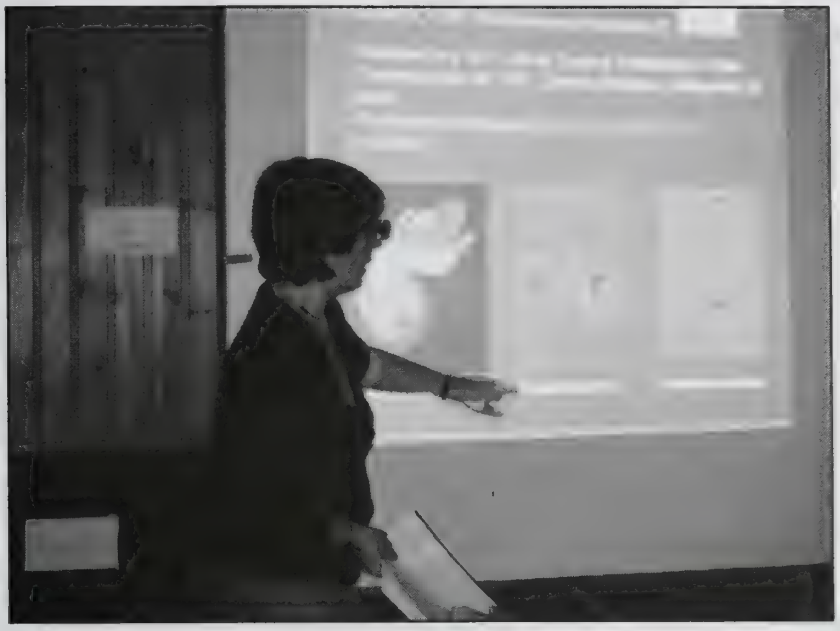
Rendez-vous à l'année prochaine – EXPO will return …



L'écho des réunions

Annie LANGLEIT

Réunion du 16 décembre 2006 (AL) ➔ **Sophie Valtat : Les Mollusques pélagiques, un panorama général.**



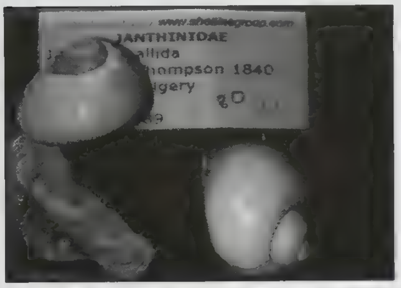
Sophie Valtat nous a appris que de drôles de mollusques, avec ou sans coquilles, se laissaient flotter, dolce farniente, à la surface des océans en faisant des bulles ou entre deux eaux à profondeurs diverses, au gré des courants marins.
De tout petits mais aussi de tout grands, parfois translucides, fantomatiques.

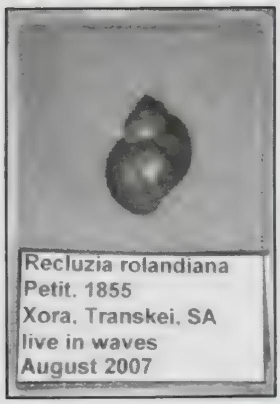
Ces organismes sont peu connus des amateurs sauf les si jolies *Janthina* et les délicates *Carinaria* ; nous avons donc découvert pas mal de choses.

Quant aux noms de ces curieuses bestioles, c'est à pleurer. Aussi Sophie, prévoyante, a commencé par la consolation, elle nous a offert un petit verre de Muscat et un super gâteau de Noël, spécialité maison.

Donc je ne vous explique pas les Caenogastropoda, Ptenoglossa, Heterobranchia, Thecosomata, Gymnosomata, Nudipleura et autres noms d'oiseaux, pardon, de Mollusques. Sachez que ce domaine est très vaste et complexe et mériterait qu'on s'y intéresse plus largement.

- SPF Cavolinioidea Gray, 1850 - suite
  - Cavoliniidae Gray, 1850 - suite
    - Clioinae Jeffreys, 1869 : Clio
    - Cuvierininae van der Spoel, 1967 : Cuvierina
    - Cavoliniinae Gray, 1850 : Diacria, Cavolinia





Quoi de neuf ?

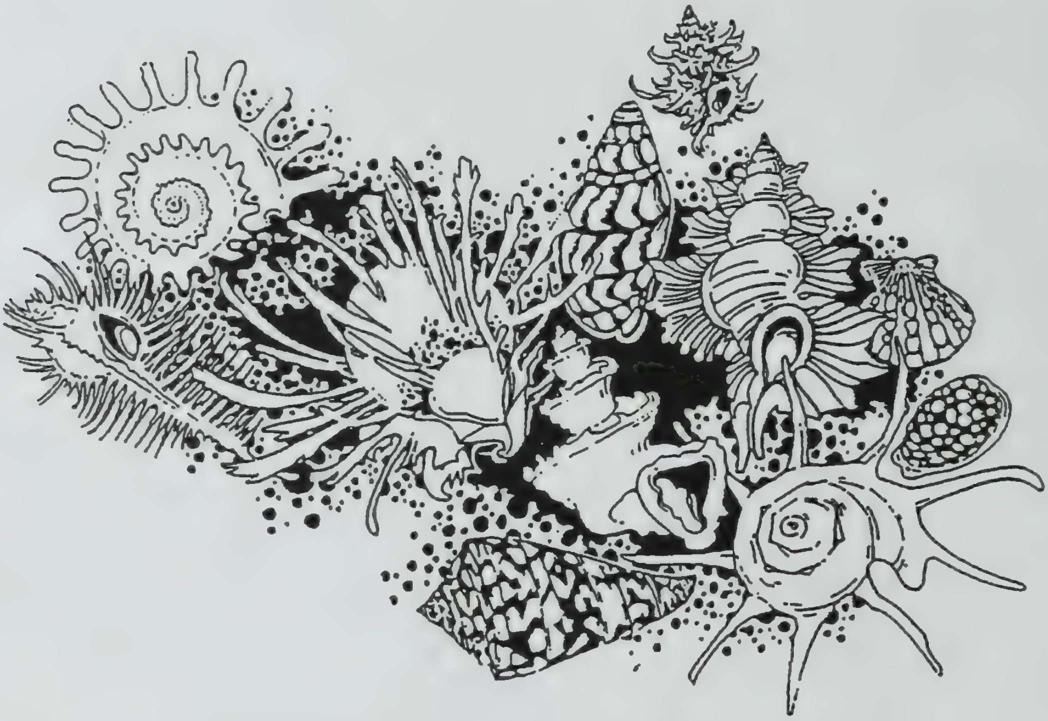
Claude VILVENS

Comme chaque année : la Bourse d'Anvers de la BVC !

BELGISCHE VERENIGING VOOR CONCHYLIOLOGIE V.Z.W.
Belgian Society for Conchology - Association Belge de Conchyliologie
www.bvc-gloriamaris.be

17ième BOURSE INTERNATIONALE AUX COQUILLAGES

5 - 6 mai 2007
Halle de Sport Schijnpoort - Antwerpen



25 nationalités - La plus grande du monde !

Samedi 5 mai : 10 h – 18 h
Dimanche 6 mai : 10 h – 16 h

entrée 2 Euro (-12 ans gratis)

Halle de Sport Schijnpoort
Schijnpoortweg 55 - 57
2060 Antwerpen
(à côté du "Sportpaleis")

Quelques nouvelles publications

Roland HOUART & Etienne MEULEMAN

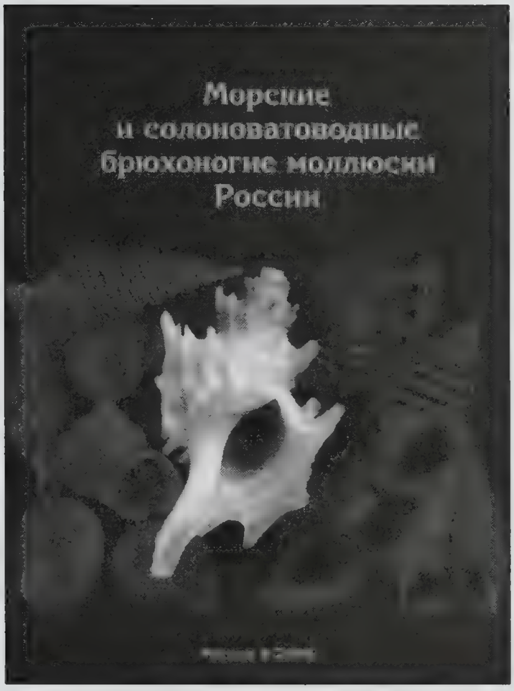
1. Quelques livres

Marine & Brackish water Gastropoda of Russia and adjacent countries : An illustrated catalogue

par **Yu. I. Kantor et A.V. Sysoev**

pp. 1-371, 140 planches couleur.
Prix: 85 € + frais d'envoi.

Format: 210 x 295 mm, couverture carton rigide.
Editeur: KMK Scientific Press Ltd, Moscou, 2006



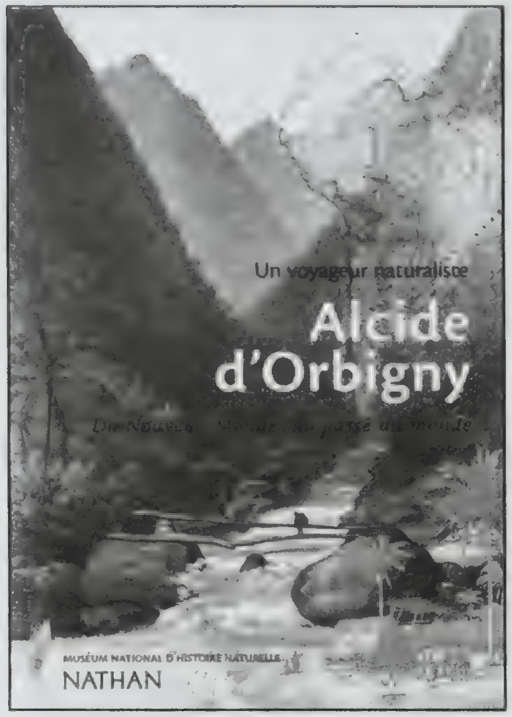
Ce livre constitue la première partie d'une série consacrée aux mollusques de Russie et des régions avoisinantes. Il contient les données et les illustrations de 1240 espèces, regroupées dans 350 genres et 110 familles d'espèces marines et d'eau saumâtre, peuplant la Russie et les régions de l'ancienne URSS. Le texte est bilingue, sur deux colonnes, russe/anglais.
Après une courte introduction discutant des diverses études et publications sur la biodiversité, les auteurs se focalisent sur les études récentes ayant mis la faune malacologique russe en exergue, notamment le catalogue des mollusques de Russie, sur lequel cette série est basée. D'autres petits chapitres tels des commentaires sur les illustrations, le matériel type, le système de classification utilisé pour ce livre et les remerciements, précèdent la liste des abréviations, toujours utile et parfois oubliée dans certains ouvrages. Un tableau des taxa supérieurs utilisés dans ce premier volume clôture le texte introductif.
La partie systématique reprend le genre actuel, le nom de l'espèce, l'auteur, la date de description, la synonymie, la localité type, le matériel type, la distribution géographique et quelques remarques sur la taxonomie, la synonymie et la distribution. La partie texte se termine par 35 pages de bibliographie contenant 790 références et par l'index taxonomique.
Les coquilles sont représentées en couleur, sur fond blanc, très souvent illustrées à l'aide de spécimens appartenant au matériel type (holotypes, paratypes, lectotypes, syntypes), avec mention de la taille et quelquefois de la localité, lorsqu'il s'agit de matériel provenant d'autres collections. Certaines petites espèces comme quelques Hydrobiidae sont représentées par des dessins.
Les photos sont excellentes et les espèces très facilement identifiables grâce à la très bonne qualité et à la taille des reproductions.
Il s'agit incontestablement d'un livre qui sera vraiment le bienvenu dans toutes les bibliothèques malacologiques. Le peu de littérature actuelle existant sur cette région, le nombre croissant de nouvelles espèces découvertes et décrites durant les dernières décennies et le désir bien compréhensible pour l'amateur ou le professionnel de vouloir identifier correctement les espèces devrait valoir un accueil très favorable à ce nouveau venu.
C'est un ouvrage à acquérir d'urgence chez votre libraire favori.

Roland Houart

Un voyageur naturaliste

Alcide d'Orbigny

Du Nouveau Monde… au passé du monde


Un voyageur naturaliste
Alcide d'Orbigny
Du Nouveau Monde… au passé du monde
MUSÉUM NATIONAL D'HISTOIRE NATURELLE
NATHAN

pp. 1-128
Format: 170 x 250 mm, couverture souple
Prix : 13 euros
N° ISBN : 2.09.261029-5
2002
Nathan
Muséum National d'Histoire Naturelle

Ce livre nous présente la vie et les travaux d'Alcide d'Orbigny. Chaque visage de ce naturaliste nous est exposé par un auteur différent. Ce naturaliste a été chargé par le Muséum national d'histoire naturelle de récolter en Amérique méridionale des minéraux, des roches, des plantes et des animaux. Il constitua ainsi des collections exceptionnelles qui seront envoyées en France. Un chapitre du livre est consacré à Alcide d'Orbigny en tant que malacologiste, d'autres nous le présente comme ichtyologiste, ornithologiste, botaniste ou encore anthropologue. Cet ouvrage a été édité à l'occasion du bicentenaire de sa naissance. Un ouvrage à conseiller à ceux qui s'intéressent aux malacologues et naturalistes qui ont marqué leur temps.

Etienne Meuleman

2. Quelques publications

Pour rappel, il s'agit ici de publications ne se trouvant à la bibliothèque de la SBM, mais qu'il est possible de consulter à l'IRSNB et le plus souvent à l'ULB. On peut consulter Roland Houart à ce sujet.

Trophonopsis Bucquoy, Dautzenberg and Dollfus, 1882 (Gastropoda, Muricidae) from the plio-Pleistocene deposits in Japan, par K. Amano. *Paleontological Research* 10 (2): 163-176 (2006).

* * *

Miocene whale-fall community from Hokkaido, northern Japan, par K. Amano & C.T.S. Little; *Palaeo* 215: 345-356 (2005)

* * *

Calyptogena (Bivalvia: Vesicomyidae) from Neogene strata in the Joetsu Districy, Niigata Prefecture, Central Japan, par K. Amano & S. Kanno. *The Veliger* 47(3): 202-212 (2005)

* * *

Temporal pattern of naticid predation on *Glycymeris yessoensis* (Sowerby) during the Late Cenozoic in Japan, par K. Amano. *palaios* v. 21: 369-375 (2006)

* * *

Notes on the endemic southern Australian corallivorous gastropod *Coralliophila mira* (Neogastropoda: Coralliophilidae), par Koh-Siang Tan. *The Marine Flora and Fauna of Esperance, western Australia.* Western Australian Museum, Perth: 245-260 (2005).

* * *

A taxonomic note on *Mancinelle siro* (Kuroda) and *M. echinata* (Blainville) (Gastropoda: Muricidae), par Koh-Siang Tan. *The Yuriyagai* 9(1): 1-9 (2003).

* * *

Feeding ecology of common intertidal Muricidae (Mollusca: Neogastropoda) from the Burrup Peninsula, western Australia. *The Marine Flora and Fauna of Perth, western Australia.* Western Australian Museum, Perth: 173-192 (2003).

* * *

The Early Pliocene Gastropoda (Mollusca) of Estepona, Southern spain. Part 6: Triphoroidea, Epitonioidea, Eulimoidea, par B. Landau, R. La Perna & R. Marquet. PALAEONTOS 10: 1-96 + 22 pls (2006)

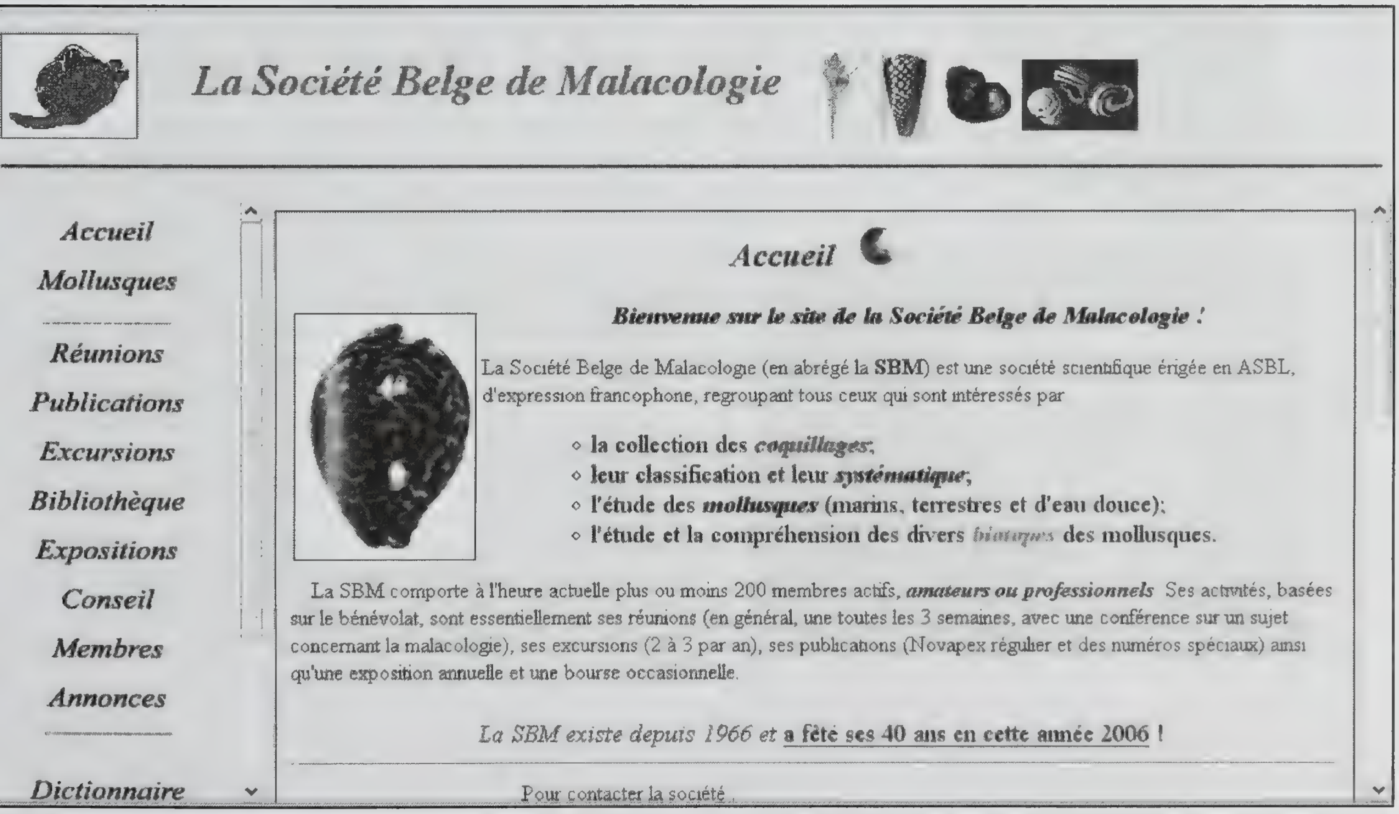
* * *

sansonia italica Raffi & Taviani, 1985, junior synonym of *Mareleptopoma minor* (Almera & Bofill, 1898). The presence of the family Pickworthiidae Iredale, 1917 in the Early Pliocene of Iberia, par B. Landau & J. Fortea. *Journal of Conchology* 39(1): 55-61 (2006).

* * *

The genus *Scaphella* (Gastropoda: Volutidae) in the Neogene of Europe and its paleobiogeographical implications, par B. Landau & C. Marques da Silva. *the nautilus* 120(3): 81-93.

Des nouvelles en direct de la SBM ? http://users.swing.be/sw216502 ou http://www.sbm.be.tf



La Société Belge de Malacologie

Accueil

Bienvenue sur le site de la Société Belge de Malacologie !

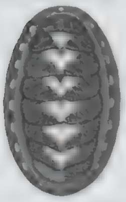
La Société Belge de Malacologie (en abrégé la **SBM**) est une société scientifique érigée en ASBL, d'expression francophone, regroupant tous ceux qui sont intéressés par

- **la collection des *coquillages*;**
- **leur classification et leur *systématique*;**
- **l'étude des *mollusques* (marins, terrestres et d'eau douce);**
- **l'étude et la compréhension des divers *biotopes* des mollusques.**

La SBM comporte à l'heure actuelle plus ou moins 200 membres actifs, ***amateurs ou professionnels*** Ses activités, basées sur le bénévolat, sont essentiellement ses réunions (en général, une toutes les 3 semaines, avec une conférence sur un sujet concernant la malacologie), ses excursions (2 à 3 par an), ses publications (Novapex régulier et des numéros spéciaux) ainsi qu'une exposition annuelle et une bourse occasionnelle.

La SBM existe depuis 1966 et **a fêté ses 40 ans en cette année 2006** !

Pour contacter la société .



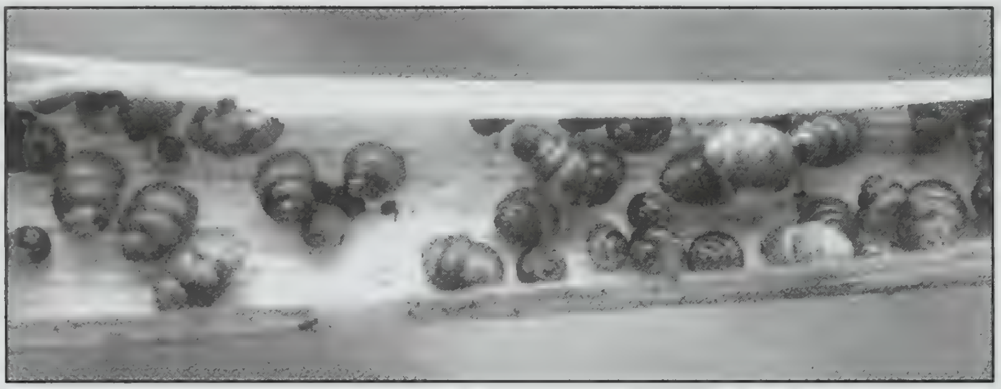
Morceaux choisis

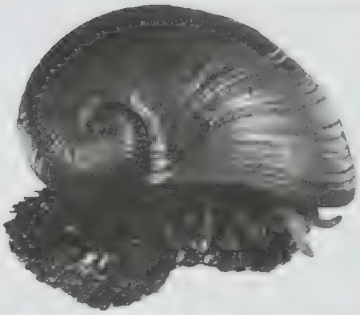
Claude VILVENS

Voici quelques articles concernant les Mollusques et la biodiversité parues ces derniers mois dans diverses revues. Une copie disponible à la bibliothèque de la SBM.

1. Natura Mosana : vol.59, n°1 – janvier-mars 2006 – Sur la présence du gastéropode *Vertigo moulinsiana* en Lorraine belge, avec quelques notes de malacologie et d'entomologie hivernales dans les marais de al Haute Semois (pp.5-25)

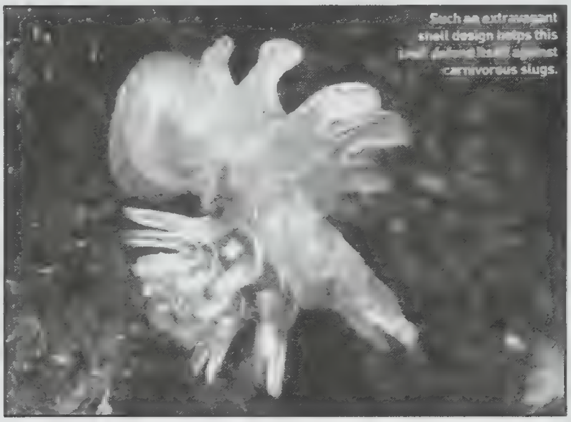
Natura Mosana est un bulletin publié avec l'aide du Ministère de la Région Wallonne (Division de la Nature et des Forêts) et rassemble diverses sociétés naturalistes des provinces Wallonnes. Ce numéro présente un intéressant article (signé J-Y Baugnée, G. San Martin & P. Verté) sur des découvertes de terrain en Lorraine plus particulièrement sur le plateau du Landbruch : *Vertigo moulinsiana* y a été trouvé en rassemblement hivernal, notamment sur des feuilles de Carex (voir photo extraite de l'article). Plus généralement, l'article repasse en revue les 7 espèces belges de *Vertigo*, avec des données sur leur distribution. Voilà qui remet en lumière ces Terrestres trop souvent négligés de par leur petite taille et leur camouflage dans les litières : belle initiative ! Dommage cependant que toutes les espèces ne soient pas illustrées (on nous renvoie à Adam).





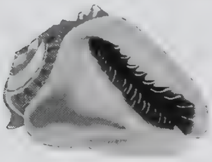
2. BBC-Wildlife : vol.24, n°11- octobre 2006 - Strange but true … Snail mail

La revue naturaliste britannique rappelle à notre bon souvenir un mollusque des "hydrothermal vents", donc d'eau profonde (Océan Indien) qui présente la particularité de posséder sur son pied des écailles métalliques (en fait, faites de sulphide de fer). Ce qui conduit évidemment à l'image d'un ecargot en armure ;-) ! Il semblerait que cette espèce n'ait pas encore de nom.



3. BBC-Wildlife : vol.24, n°12- décembre 2006 – Protected by design (p.35)

La même revue naturaliste, dans son numéro de décembre, nous ramène vers les *Opisthostoma*, ces Terrestres aux formes que l'on peut presque qualifier d'"extravagantes" – la raison étant probablement la défense contre les prédateurs. Les espèces dont il est question ici vivent à Bornéo – il est question ici d'une étude réalisée sur les rives de la rivière Kinabatangan. Autre point remarquable : on trouve une espèce différente pratiquement à chaque colline, ce qui rend évidemment ces organismes très exposés à tout changement d'environnement … voilà qui rappelle, par exemple, certains Terrestres de Madagascar.



Nous avons reçu

Claude VILVENS

LES NATURALISTES BELGES

(Belgique)
Vol. 87, N°2-3, avril-septembre 2006

La Grive litorne et l'herpétologie des bords de routes wallonnes … mais pas de Mollusques.

THE STRANDLOPER

(Afrique du Sud)
N° 283, novembre 2006

Intraspecific variation in *Staphylaea limacina*	4
Gastropodial musings	9
Slinger, a source of rare shells	10
Ex pisce countdown	11
A gastropod bivalve or a bivalved gastropod?	12
Nautilus, a master of buoyancy control	14
Did you know?	17
A scarce endemic fissurellid	18
Shell puzzle No. 2	20

THE FESTIVUS

(U.S.A. – Californie)
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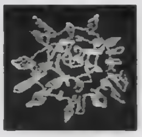

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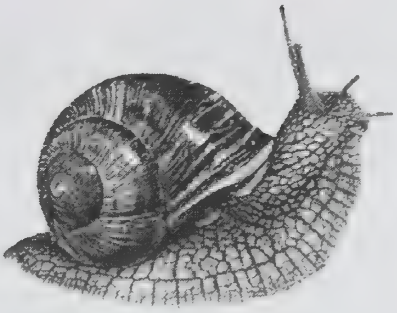

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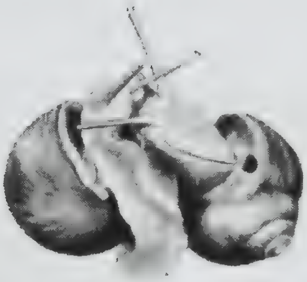

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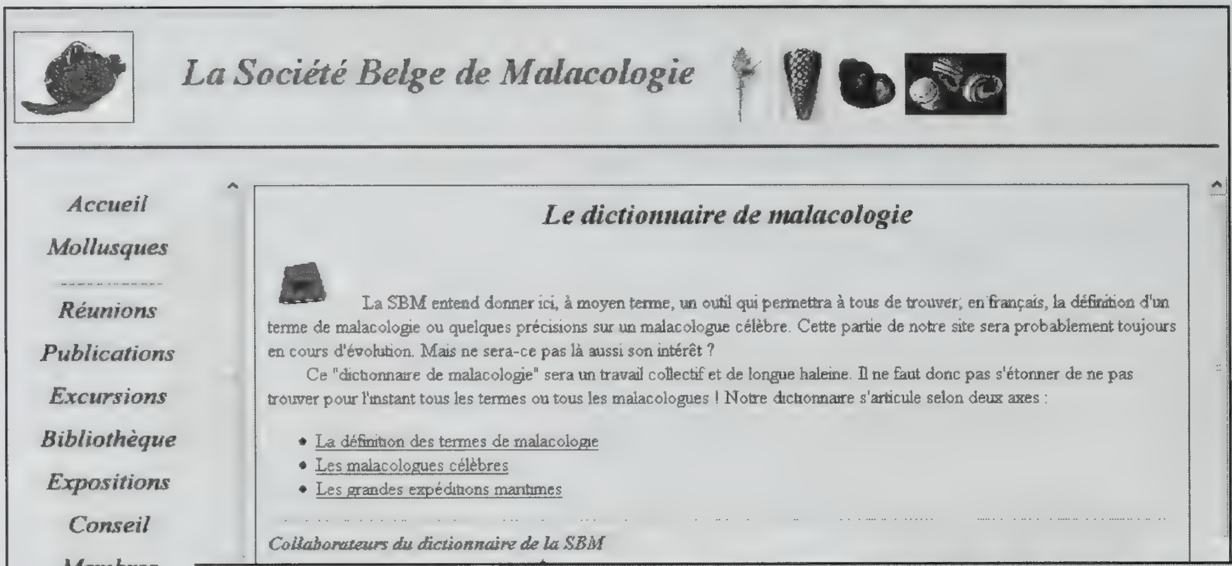
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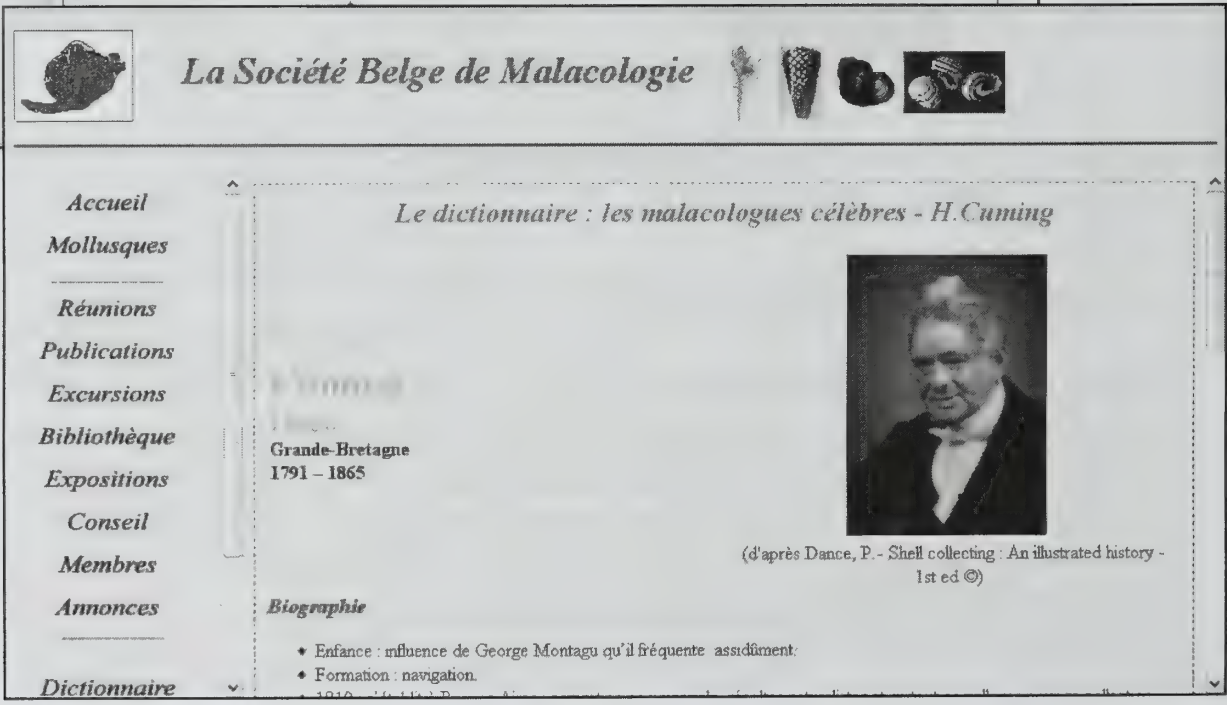
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Grandes marées de l'année 2007

Christiane DELONGUEVILLE et Roland SCAILLET

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Coefficients (> 100) des pleines mers à Brest

(Les marées basses correspondantes sont donc particulièrement intéressantes à prospecter.)

Janvier	-	-
Février	Dimanche 18	101 - 105
	Lundi 19	108 - 110
	Mardi 20	110 - 108
	Mercredi 21	105 - 100
Mars	Dimanche 18	(95) - 102
	Lundi 19	108 - 113
	Mardi 20	115 - 116
	Mercredi 21	115 - 112
	Jeudi 22	107 - 101
Avril	Lundi 16	(96) - 102
	Mardi 17	107 - 111
	Mercredi 18	112 - 112
	Jeudi 19	110 - 107
	Vendredi 20	102 - (95)
Mai	Mercredi 16	(98) - 100
	Jeudi 17	102 - 101
	Vendredi 18	100 - (97)

Juin	-	-
Juillet	-	-
Août	Mercredi 29	100 - 103
	Jeudi 30	106 - 107
	Vendredi 31	106 - 104
Septembre	Samedi 1	100 - (95)
	Mercredi 26	(96) - 102
	Jeudi 27	107 - 110
	Vendredi 28	112 - 112
	Samedi 29	110 - 107
	Dimanche 30	101 - (95)
Octobre	Jeudi 25	(96) - 101
	Vendredi 26	106 - 108
	Samedi 27	109 - 109
	Dimanche 28	106 - 103
Novembre	Dimanche 25	100 - 100
Décembre	-	-

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Annuaire des Marées pour l'année 2007 - Tome I - Ports de France - SHOM (Service Hydrographique et Océanographique de la Marine) - *Paris - 201 pp.*

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Triphoridae (Mollusca: Gastropoda) of Reunion Island (Indian Ocean): Types revisited

Maurice JAY
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KEYWORDS. Triphoridae, type material, Reunion Island.

ABSTRACT. Fourteen species of Triphoridae have been described from Reunion. The type material is examined and illustrated, and the status of the nominal species is revised. Six neotypes are designated. All species are illustrated by SEM and /or colour figures.

RESUME. Quatorze espèces de Triphoridae ont été décrites de la Réunion. Le matériel type est examiné et illustré et le statut de ces espèces nominales est révisé. Six néotypes sont désignés. Des illustrations en microscopie électronique à balayage et/ou des illustrations couleurs sont données pour chaque espèce.

INTRODUCTION

To my knowledge, only two authors, Deshayes (1863) and Jousseaume (1884 and 1896) have described new species of Triphoridae from Reunion. In the present paper I evaluate them, fix primary types, and provide modern, high quality illustrations for each of these species.

The "Catalogue des mollusques de l'île de la Réunion", by Deshayes, is part of a book by L. Maillard, "Notes sur l'Ile de la Réunion". In this work, Deshayes described the material gathered on Reunion and entrusted to him by Maillard. Deshayes recognized 560 species, of which 12 were species of Triphoridae. He attributed two of them to taxa already known, namely *Triphora sculpta* (Hinds, 1842), and *Triphora monilifer* (Hinds, 1842), and described the other 10 as new species. Deshayes's collection was deposited in the "Ecole des Mines" in Paris, where he was a professor. After a phase of curatorial neglect in the 1960-1970s, it was decided that the mollusc collection of that institution would be incorporated with the paleontological collection of the University of Lyon, with the types of recent species to be deposited in MNHN. The "Ecole des Mines" collection was thus searched by P. Bouchet in 1978 for such types, before the actual transfer of the rest of the material to Lyon, and I myself searched the collection in Lyon to double check for missing types.

Besides Deshayes' types, MNHN holds material labelled "ex. d'auteur ("author's specimens"), coll. Vignal, Com. Eudel, 1941, St. Pierre" [Reunion Island], whose status has to be discussed. Emile Eudel was a merchant mariner. He gathered shells from around the world, and visited St Pierre, on Reunion, where his brother lived. Eudel's collection was sold in Paris in 1893. Sowerby purchased part of it, and Vignal purchased another part, mainly Cerithioidea. The collection of Vignal was acquired by MNHN in 1941. In the foreword of his work, Deshayes (1863) thanked Eudel for sending him, preserved in alcohol, shell-less molluscs not present in Maillard's collection. Eudel's collection also contains one lot labelled "*Cerithiopsis blandi* Deshayes (in litt.)". It is thus clear that Eudel was in touch with Deshayes, but we do not know whether the indication "Ex. d'auteur" implies that specimens were sent by Deshayes to Eudel as a gift, or whether Deshayes identified for Eudel material in his collection. As Deshayes did not explicitly cited Eudel's specimens in his work, I do not regard these specimens as part of the original type lot.

The illustrations in Deshayes' paper (1863) are of small size, and lack precision, and this is why it is necessary to revise the status of the nominal species based on the type material. However, Deshayes' types consist mainly of beach specimens, often broken and incomplete, especially lacking protoconchs. In several lots, the specimens labelled as "syntypes" clearly do not match the original description. Furthermore, some types could not be found and must be considered lost.

Jousseaume described many species of Triphoridae from the Red Sea and from New Caledonia, and only 4 are from Reunion (designated in Jousseaume as "Bourbon", an earlier name for the island). Two species were described in his « Monographie des Triphoridae » (Jousseaume 1884), and two others in a publication with a misleading title, « Triphoridae de la Mer Rouge recueillis et décrits par le Dr. Jousseaume » (Jousseaume 1896). By contrast to Deshayes' types, the types of Jousseaume are all present in MNHN, and are in rather good condition.

Abbreviations

MNHN: Museum National d'Histoire Naturelle. Paris. France.
MJ: Collection of the author.

SYSTEMATICS

Family: **TRIPHORIDAE** Gray, 1847.
Genus ***Triphora*** Blainville, 1828.
Type species: *Triphora gemmatum* Blainville, 1828 (by original designation). Recent, Mauritius, Indian Ocean.

Triphora adamsi (Deshayes, 1863).
Figs 1-3, 45

Triphoris adamsi Deshayes 1863: 100, species number 322, pl. XI, figs 23-24.

Type locality. Reunion Isl. without any other data.

Type material. There is a single specimen labelled as a syntype in MNHN 1579 (Fig 45). This specimen is in good state, has a protoconch of 5 whorls bearing 2 fine spiral cords, crossed by close-set fine axial riblets, and a rounded apex. The teleoconch whorls bear 3 beaded spiral cords, the middle one weaker on earlier whorls, but well developed on the last 3 whorls. The shell is glossy, pale brown, the earlier whorls whitish, the protoconch is brown, the last whorl pale brown.

Comments. The species is easily recognizable, and is very common on Reunion, where I have found empty shells in sand at depths ranging from 5 to 40 m. The voucher specimen illustrated by SEM (Figs 1-3), 4 mm, from cape La Houssaye, Saint Paul, in hand-dredged sand at 20m, is now in MNHN.
In my opinion *Triphora adamsi* (Deshayes, 1863) is quite a valid species.

Triphora angustissima (Deshayes, 1863).
Figs 4-6, 46

Triphoris angustissimus Deshayes 1863: 104, species number 328, pl. XII, figs 1-2.

Type locality. Reunion, cape La Houssaye, Saint Paul, depht 10-12 m. Determined by locality of neotype.

Type material. No original type material could be detected in MNHN, nor in Lyon. A neotype is here designated, MNHN 9488 (Figs 4-6, 46).

Comments. The original description refers to an elongate and narrow shell, with 2 unequal spiral rows of beads, the abapical row with larger beads, and with a wide and canaliculated suture, size 4 x 0.75 mm.
This valid species is readily recognizable from Deshayes' description and figure, and is fairly common on Reunion where I collected over 200 specimens, dead in sand (Fig. 46).

Description of the neotype. Shell narrowly conical, with very slightly convex edges, base not constricted. Protoconch poorly distinct from teleoconch, consisting of 2 whorls with a small rounded apex ; each whorl bearing 2 beaded spiral cords, the lower with strong beads, the upper one with very weak beads, the beads on protoconch being more numerous and more closely set than on teleoconch (18 beads per whorl). Teleoconch comprising 13 whorls, bearing 2 beaded spiral cords, the lower being stronger, 14 beads per whorl ; suture moderately impressed. Aperture wide quadrangulate, posterior canal short directed downward . Colour greyish cream, becoming whitish towards summit. Size 5.3 x 1 mm. Dead on sand bottom near coral reefs, cape La Houssaye, Saint Paul, depht 10-12 m.

Triphora crenulata (Deshayes, 1863).
Figs 7-9, 37, 47

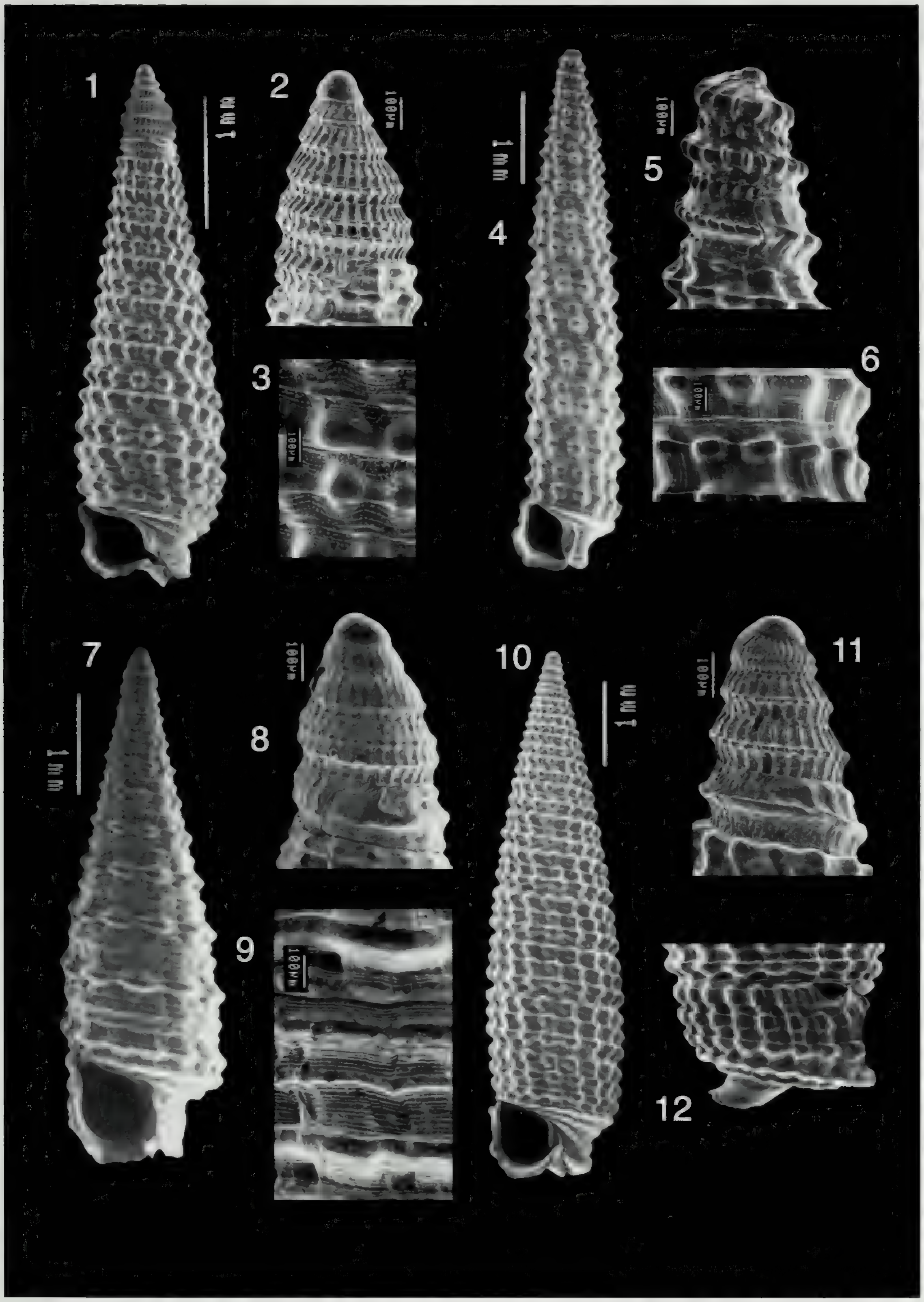
Triphoris crenulatus Deshayes 1863: 99-100, species number 321, pl. XI, figs 21-22.

Type locality. Reunion.

Type material. A single juvenile specimen, labelled syntype, is in MNHN 0721. It is somewhat faded, but has an intact protoconch, and measures 4.8 mm. (Fig. 37).

Figures 1-12

1-3. *Triphora adamsi* (Deshayes , 1863)
1. Cape La Houssaye, Saint Paul, Reunion, dead in hand-dredged sand at 20m, 4 mm; **2.** Protoconch; **3.** Last whorl, detail of microsculpure.
4-6. *Triphora angustissima* (Deshayes, 1863)
4. Neotype, MNHN 9488, Cape La Houssaye, Saint Paul, Reunion, dead in hand-dredged sand at 20m, 7.2mm; **5.** Protoconch; **6.** Last whorl,detail of microsculpture.
7-9. *Triphora crenulata* (Deshayes, 1863)
7. Cape La Houssaye, Saint Paul, Reunion, dead in hand-dredged sand at 20m, juvenile, 5 mm; **8.** Protoconch ; **9.** Last whorl, detail of microsculpture.
10-12. *Triphora distincta* (Deshayes, 1863)
10. Neotype, MNHN 9489, Cape La Houssaye, Saint. Paul, Reunion, at 20m, 7.4 mm; **11.** Protoconch; **12.** Aperture.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Comments. Deshayes described a 9 mm x 2.5 mm shell. Specimens that match the original description and the syntype are not infrequently found in Reunion, but the species is not common. A juvenile specimen of the same size as the type is selected and illustrated by SEM (Figs 7-9). Figure 47 is an adult specimen, 9 mm.

This nominal species, remarkable because of its coloured pattern, may be a synonym of *Triphora (Ino) elegans* (Hinds, 1842) p.18, Plate VIII fig 11, (Straits of Malacca, in mud 20 fathoms). But this remains uncertain, Hinds'description being short and the figure small.

Marshall (1983: 51, figs 21G-I) placed this species in genus *Euthymella*.

Triphora distincta (Deshayes, 1863).

Figs 10-12, 38, 48

Triphoris distinctus Deshayes 1863: 103, species number 326, pl. XI, figs 30-31.

Type locality. Reunion, cape La Houssaye, Saint Paul, depht 10 m. Determined by locality of neotype.

Type material. One lot in MNHN 0719 labelled "syntypes" consists of 3 specimens glued to a cardboard (Fig 38). These worn specimens, lacking their protoconch, are brown except the first three whorls that are whitish, and have 2 beaded spiral cords of 18-20 beads per whorl, the upper row somewhat paler. These specimens do not match the description and illustration of *Triphora distincta,* which has 3 beaded cords per whorl. A substitution of labels may have occurred, and I do not regard these specimens as syntypes. Furthermore, until now no specimen with the characters of these supposed syntypes has been found in Reunion. Therefore a neotype is here designated, MNHN 9489 (Figs 10-12, 48).

Comments. Deshayes' description is of a conical and slightly convex shell, comprising 13 whorls, each bearing 3 unequal spiral rows of beads, the middle one weaker; suture canaliculated; colour dark brown, dimensions 5 mm x nearly 2 mm. The illustration shows a conical, slightly fusiform shell, with 3 beaded spiral cords, subequal on last whorl, the middle cord weak on adapical whorls; 9 beads per half whorl.

Shells corresponding to that description are common on Reunion. The 5 specimens from the MNHN lot labelled "Ex. d'auteur, Coll. Vignal, 1941" (not type material) are similar.

Triphora distincta Deshayes, 1863 is a valid species.

Description of the neotype. Shell fusiform, base slightly constricted. Protoconch quite distinct, consisting of 4 whorls, bearing a single spiral carina crossed by numerous closely-set axial riblets, and a small rounded smooth apex. Teleoconch comprising 12.5 whorls, the earlier ones bearing 2 spiral beaded cords, a third median weak cord appearing at the fifth whorl, becoming equal to others on the 3 last whorls. 24-25 beads per whorl. Suture moderatly impressed. Aperture quadrangular, posterior canal short and recurved. Colour brown, the 4 earlier whorls whitish, protoconch pale brown. Size 6.3 x 1.7mm. Dead in sand near coral reef, cape La Houssaye, Saint Paul, at the depht of 10 m.

Triphora formosa (Deshayes, 1863).

Figs 13-15, 49, 50

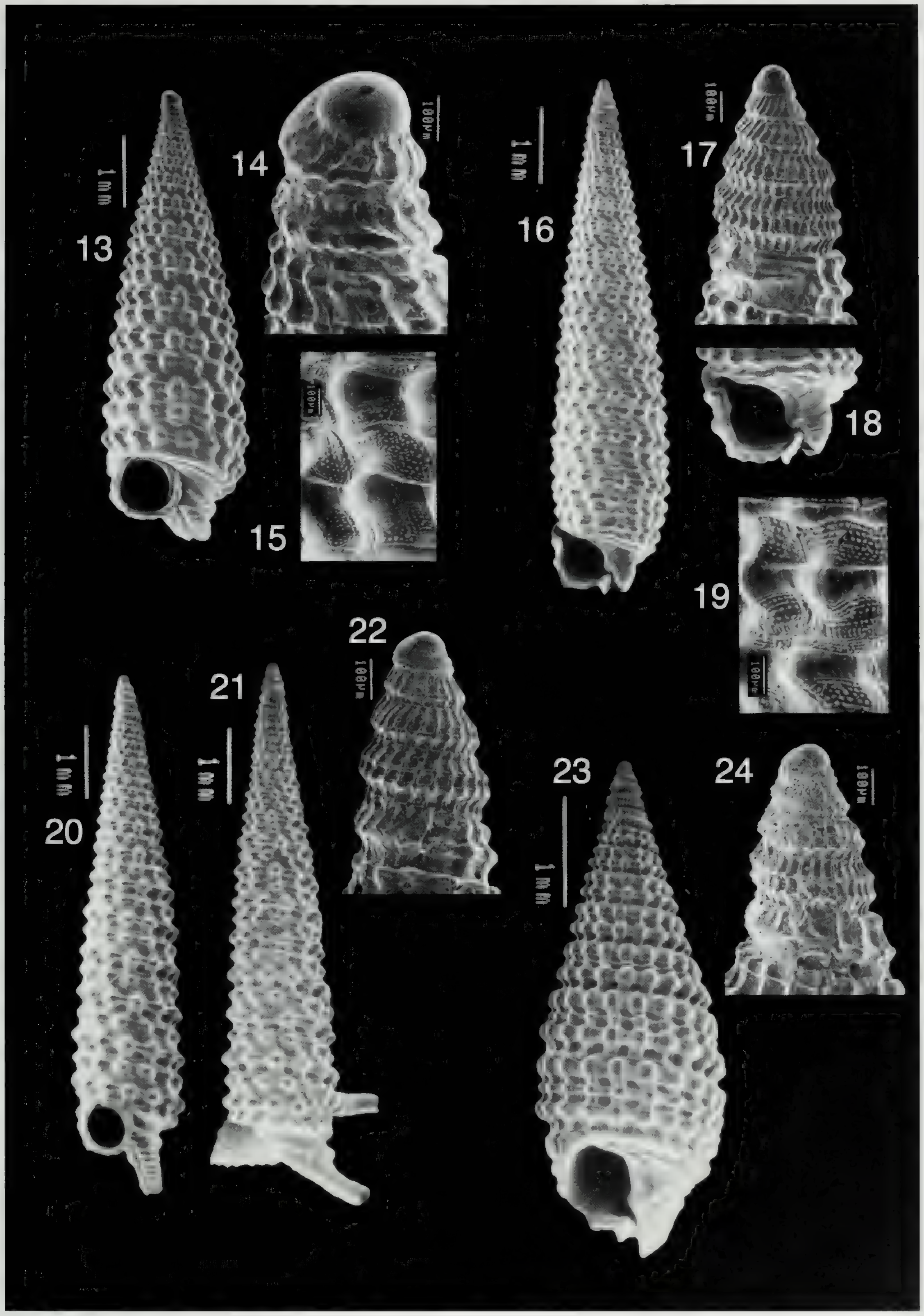
Triphoris formosus Deshayes 1863: 102, species number 325, pl. XI, fig. 29.

Type locality. Reunion, cape La Houssaye, Saint Paul, depht 10-12 m. Determined by locality of neotype.

Type material. No original type material found in MNHN, nor in Lyon. A neotype, MNHN 9487, is here designated (Figs 13-15, 49).

Figures 13-24

13-15. *Triphora formosa* (Deshayes, 1863)
13. Neotype, MNHN 9487, Cape La Houssaye Saint Paul, Reunion; dead in hand-dredged sand at 25 m, 8.2 mm; **14.** Protoconch; **15.** Last whorl, detail of microsculpture.
16-19. *Triphora hindsi* (Deshayes, 1863)
16. Neotype, MNHN 8490, Cape La Houssaye, Saint Paul, Reunion, dead in hand-dredged sand at 20 m, 8.1mm; **17.** Protoconch; **18.** Aperture; **19.** Last whorl, detail of microsculpture.
20-22. *Triphora mirifica* (Deshayes, 1863)
20. Neotype, MNHN 9491, Cape La Houssaye, Saint Paul, Reunion, dead in hand-dredged sand at 15 m, 8.5 mm; **21.** Side view; **22.** Protoconch.
23-24. *Triphora pupaeformis* (Deshayes, 1863)
23. Neotype, MNHN 9492, Cape La Houssaye, Saint Paul, Reunion, dead in hand-dredged sand at 20m, 4.8 mm; **24.** Protoconch.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Comments. Deshayes' description is of an elongate and pointed shell with a deep canaliculated suture, 2 spiral rows of beads that are not axially aligned but disposed in alternate rows, colour pale pinkish violet with paler beads; aperture small and circular, terminal canal long and recurved posteriorly; dimensions 6 mm height x a little less than 1.75 mm diameter. The original illustration shows a high, slender, and pointed shell with 2 beaded spiral cords per teleoconch whorl, and 7 beads per half whorl.
Triphorid specimens matching Deshayes original description and neotype, except for colour pattern, are regularly found in Reunion, though uncommon; some of them with a violaceous background and a yellowish abapical cord (Fig. 50), these colours fading with time, while other specimens are plain light brown. These probably only represent colour variations, as they all have a similar protoconch, and a completely closed anal canal.

Description of the neotype. Fusiform shell, conical, tapering to a sharp apex, base slightly constricted. Protoconch hardly distinct from teleoconch, consisting in 2 whorls bearing a single strong beaded spiral cord crossed by axial riblets , and a smooth apex. Teleoconch of 12 whorls, 2 beaded spiral cords per whorl, the beads in alternate rows. Suture deep, canaliculated. Aperture circular, anterior canal long and recurved, and a short and small third canal on the left side ot outer lip. Colour pale violet with paler beads. Size 6.2 x 1.8 mm. Dead in sand near coral caves, 10-12 m, cape La Houssaye, Saint Paul.
Triphora formosa (Deshayes, 1863), is a valid species.

Triphora hindsi (Deshayes, 1863).

Figs 16-19, 39, 51

Triphoris hindsi Deshayes 1863. 98-99, species number 320 pl. XI, figs 19-20.

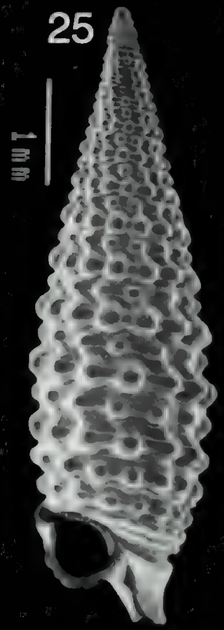
Type locality. Reunion, cape La Houssaye, Saint Paul, depht 10m. Determined by locality of neotype.

Type material. One lot MNHN 0709 labelled "syntypes" comprises 5 specimens originally glued to cardboard, but the best of which (Fig. 39) was detached, presumably for study. All are white and very worn. Only the detached specimen has the two last whorls of the protoconch left, on which two fine spiral cords crossed by fine axial riblets remain conspicuous. The teleoconch whorls of the 5 specimens are only ornamented with 2 beaded spiral cords. These specimens do not match the description and illustration of *Triphora hindsi* in Deshayes, which has 3 beaded spiral cords on the last whorls. Here also, a substitution of labels may have happened. These supposed "syntypes" belong to a species that is common in Reunion.
A neotype is here designated, MNHN 9490 (Figs 16-19, 51).

Comments. Deshayes described an elongate and narrow shell, with 3 beaded spiral cords on teleoconch whorls, the middle one being slightly weaker, with a narrow suture hardly distinguished from the space between cords. He described it as pale brown in colour, with whitish beads, and 6 x 1.25 mm in size. Deshayes' figure shows 3 beaded spiral cords on teleoconch whorls, subequal on the 3 last whorls, but with the middle one weaker on the 2 preceding whorls, while there are only 2 spiral cords on the 5 earlier whorls; there are 9 beads per half whorl.
Another species, common in Reunion, matches exactly Deshayes'description and figure, and the specimens of the Vignal collection in MNHN labelled *T. hindsi* Deshayes, (not type material) and is then the true *Triphora hindsi*.

Figures 25-36

25-27. *Triphora reevei* (Deshayes, 1863)
25. Neotype, MNHN 9493, Cape La Houssaye, Saint Paul, Reunion, dead in hand-dredged -sand at 15 m, 6 mm; **26.** Protoconch; **27.** Side view of last whorl.
28-30. *Triphora trilirata* (Deshayes, 1863)
28. Cape La Houssaye, Saint Paul, Reunion, dead in hand-dredged sand at 15 m, 8.9 mm; **29.** Protoconch; **30.** Detail of microsculpture.
31-33. *Mastoniaeforis chaperi* Jousseaume, 1884
31. Cape La Houssaye, Saint Paul, Reunion, dead in hand-dredged sand at 15 m, 6.5 mm; **32.** Protoconch; **33.** Side view of aperture.
34-36. *Mastonia interpictus* Jousseaume, 1896
34. Cape la Houssaye, Saint Paul, Reunion, dead in hand-dredged sand at 15 m, 8 mm; **35.** Protoconch; **36.** Detail of microsculpture.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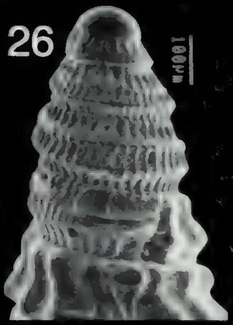
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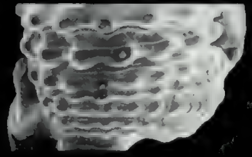
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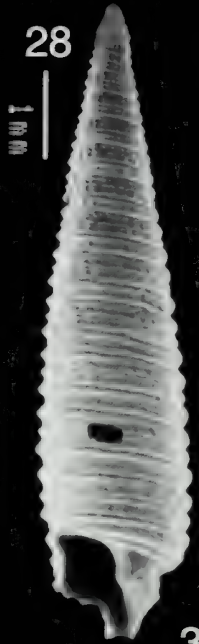
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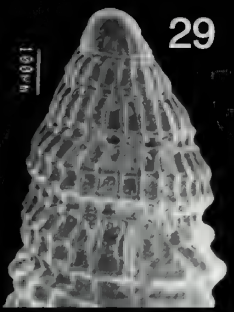
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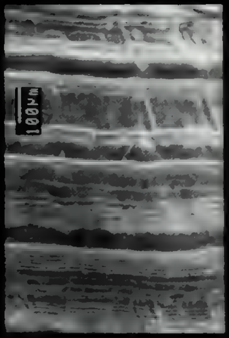
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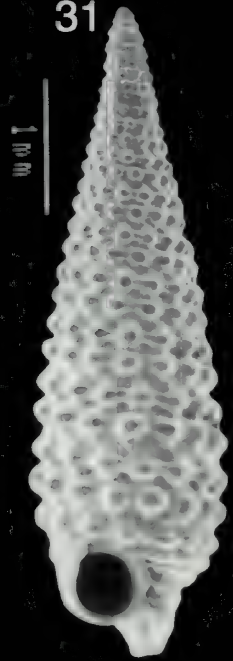
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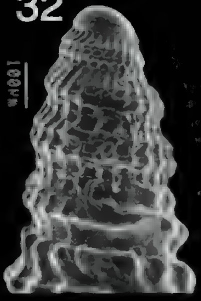
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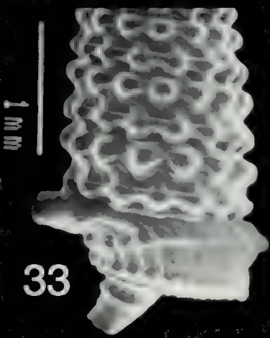
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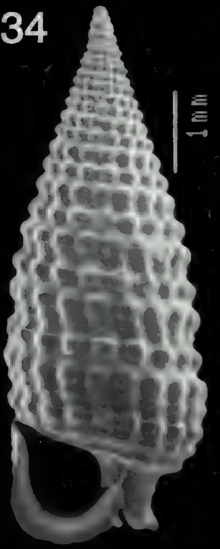
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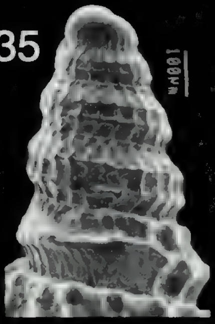
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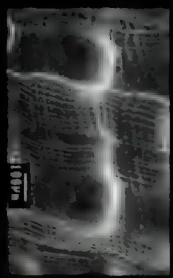
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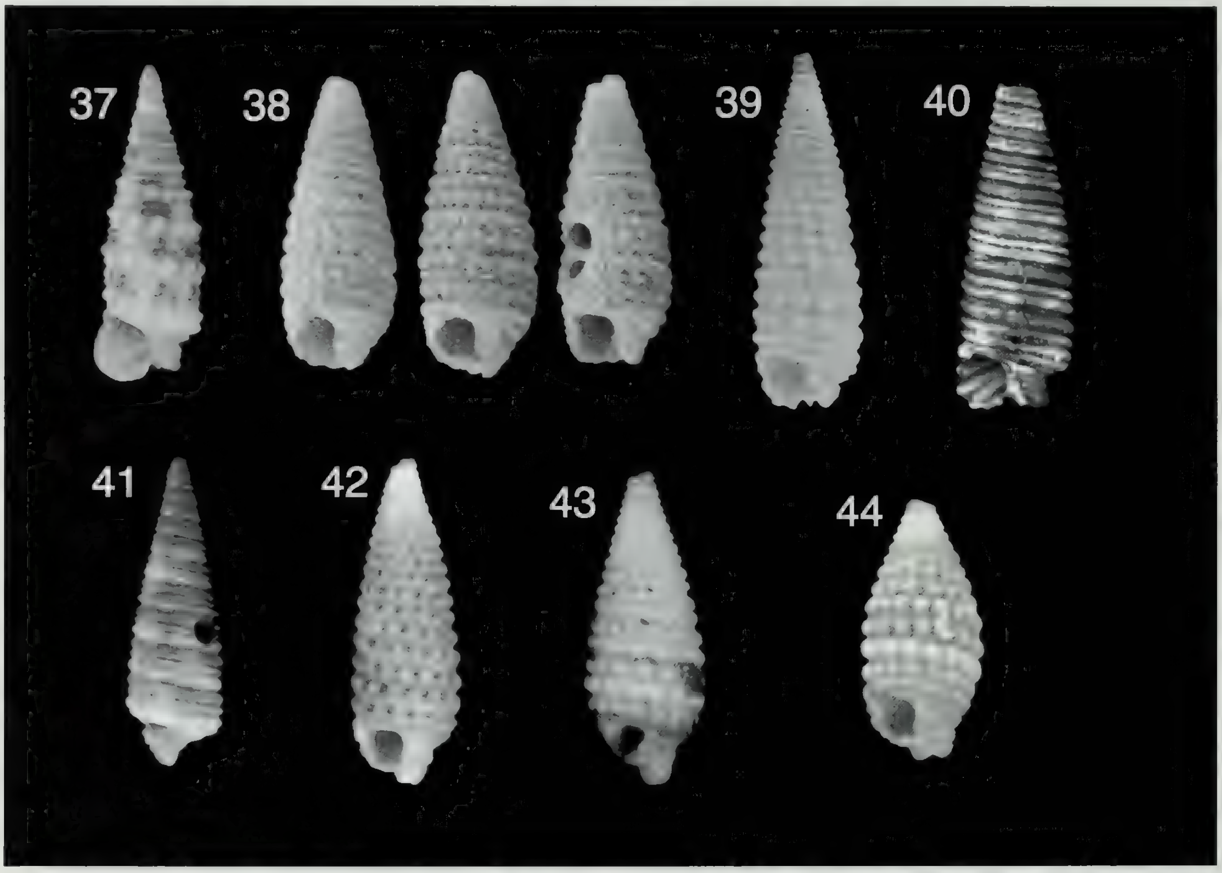
Description of the neotype. Shell conical, slightly constricted at base. Protoconch consisting of 4 whorls tapering to a smooth hemispherical apex, each whorl bearing 2 spiral carinas crossed by numerous closely set axial riblets. Teleoconch of 14 whorls, the earlier 4 with 2 beaded spiral cords ; a fine smooth cord appears between them at the fifth whorl and becomes beaded at the seventh whorl, beads only equal to the other 2 rows on last whorl. Microsculpture appearing between the cords, consists of very fine cords and riblets intersecting at right angles. Aperture circular, posterior canal recurved, a third hole on the left side of aperture. Colour pale brown, beads slightly paler, the 2 earlier whorls of teleoconch whitish, protoconch brown. Size 7 x 1.5 mm. Found in muddy sand at 10 m, cape La Houssaye, Saint Paul.
The species is quite valid.



Figures 37-44

37. *Triphora crenulata* (Deshayes, 1863). Holotype, MNHN 0721, Reunion, 4.8 mm: **38.** *Triphora distincta* (Deshayes, 1863). Specimens labelled syntypes, MNHN 0719. Reunion, from left to right: 4 mm; 4.1 mm; 4 mm; **39.** *Triphora hindsi* (Deshayes, 1863). The best specimen of the lot labelled syntypes, MNHN 0709. Reunion, 6.1 mm; **40-41.** *Triphora trilirata* (Deshayes, 1863). **40.** The best of syntypes, MNHN 1676. Reunion, 4 mm; **41.** Complete juvenile specimen labelled syntype, Reunion, 3.8mm; **42.** *Mastonia interpictus* Jousseaume, 1896. Holotype, MNHN 1575, Djibouti and Bourbon, 5 mm; **43.** *Mastoniaeforis chaperi* Jousseaume, 1884. Holotype, MNHN 1575, Bourbon, 3.9 mm; **44.** *Obesula borbonica* Jousseaume, 1896. Syntype with slightly broken protoconch, MNHN 0728. Red sea and Bourbon, 2.9 mm.

Triphora mirifica (Deshayes, 1863).
Figs 20-22, 52

Triphoris mirificus Deshayes 1863:104, species number 327, pl. XI, figs 32-33.

Type locality. Reunion, cape La Houssaye, Saint Paul, depht 10 m. Determined by locality of neotype.

Type material. None located. The type specimen of "*Triforis mirifica lifuana* Hervier, 1898", MNHN 1508 (type locality Lifou, New Caledonia) is present in MNHN, and does not show any obvious difference with our material from Reunion. A neotype is here designated, MNHN 9491 (Figs 20-22, 52).

Comments. Deshayes' description and figure are of a very distinctive species, remarkable by its 2 strongly unequal spiral beaded cords on teleoconch whorls, very long siphonal and anal canals and tube-like aperture, and protoconch ornamented with 2 spiral cords crossed by axial riblets.
This species is very common in Reunion, with more than 200 specimens collected.

Description of the neotype. Shell regularly conical, elongate and narrow. Protoconch consisting of 4 whorls, each one with 2 spiral carinas, the lowest stronger, crossed by fine axial riblets, and tapering to a rounded smooth apex. Teleoconch of 13 whorls ornamented with 2 beaded spiral cords, strongly unequal, the lower row of beads obviously stronger. 14 beads per whorl. Aperture small and circular, siphonal canal recurved, anal canal long narrow cylindrical, opposite to aperture. Colour creamy white, the beads paler, protoconch and base light brown. Size 7 x 1.5 mm. In dredged sand at 15 m, cape La Houssaye, Saint Paul.
Triphora mirifica Deshayes, 1863, is a valid species.

Triphora pupaeformis (Deshayes, 1863).
Figs 23-24, 53

Triphoris pupaeformis Deshayes 1863: 105, species number 329, pl. XII, figs 3-4.

Type locality. Reunion, cape La Houssaye, Saint Paul, depth 20 m. Determined by locality of neotype.

Type material. None located. A neotype is here designated, MNHN 9492 (Figs 23-24, 53).

Comments. Deshayes' description is of a short, cylindrical shell, with a spire prolonging into a pointed rostrum, hardly visible suture, and narrow teleoconch whorls bearing 2 spiral rows of flattened, wide, closely-set granules that are whitish on the summit but arise from a blackish-brown ground, dimensions 4 x 1.5 mm. The original illustration shows a shell with an obviously broken protoconch. We have found on Reunion a few specimens exactly matching the description and figure of Deshayes, but the species is very rare. This is a valid species. A few smaller and paler specimens of same shape and sculpture have been collected. They may also belong to this same species.

Description of the neotype. Shell conical, wide, restricted at base. Protoconch of 3 whorls, bearing 2 spiral carinas crossed by numerous axial riblets, and tapering to a smooth rounded apex. Teleoconch of 8 whorls, 2 spiral rows of round beads numbering 18 per whorl. A fine thread appears between the 2 cords, smooth at the sixth whorl, bearing small beads at the seventh whorl, remaining obviously smaller than the 2 other rows on last whorl. Ground colour blackish-brown, beads paler, greyish on the upper row, whitish on the lower row. Earlier whorls whitish, protoconch brown. Size 4.5 x 1.8 mm. In dredged sand at 20m, cape La Houssaye, Saint Paul.

Triphora reevei (Deshayes, 1863).
Figs 25-27, 54

Triphoris reevei Deshayes 1863: 101, species number 323, pl. XI, figs 25-26.

Type locality. Reunion, cape La Houssaye, Saint Paul, depth 15 m. Determined by locality of neotype.

Type material. None located. A neotype is here designated, MNHN 9493 (Figs 25-27, 54).

Comments. Deshayes' description is of a narrow, elongate and pointed shell of white colour with a blackish blotch, with 2 unequal rows of beads, the abapical row (called the upper cord by Deshayes, on account of his way to position the shells with the aperture upwards) being stronger, a narrow, hardly visible suture, size 5 x 1.25 mm. The illustration shows a conical shell with 2 spiral beaded cords on teleoconch whorls, the abapical cord being stronger.
In Reunion, a single species matches Deshayes' description and figure.

Description of the neotype. Shell fusiform elongate, pointed, base constricted. Protoconch of 3 whorls, bearing 2 spiral carinas crossed by numerous closely-set axial riblets, with a smooth rounded apex. Teleoconch consisting of 12 whorls, bearing 2 spiral cords crossed by axial ribs, with a strong bead at each crossing, the beads of the lower cord stronger, 13 -14 beads per whorl. Aperture circular. Posterior canal slightly recurved. Creamy white, the beads on the lower cord paler, protoconch dark brown, a dark brown blotch on siphonal canal. Height 8 mm. In muddy sand at 15 m, cape La Houssaye, Saint Paul.
Triphora reevei (Deshayes, 1863), is a valid species.

Triphora trilirata (Deshayes, 1863).

Figs 28-30, 40, 41, 55

Triphoris triliratus Deshayes 1863:102, species number 324, pl. XI, figs 27-28.

Type locality. Reunion.

Type material. 3 lots in MNHN are labelled syntypes. All appear to be conspecific, although some of them are very worn and hardly recognizable. The best specimen MNHN 1676 is figured (Fig. 40). Only one other specimen has its protoconch (Fig 41); though it is worn, it shows on each whorl 2 spiral cords crossed by numerous fine axial riblets.
A voucher specimen is illustrated by SEM, Figs 28-30; height 10 mm, cape La Houssaye Saint Paul, at 20 m.

Comments. *Triphora trilirata* (Deshayes, 1863), is a valid and easily recognisable species very common in Reunion. Shells are found in sediments at depths from 5 to 40 m. It resembles another species, tentatively identified as *Viriola fallax* Kay, 1979, that differs by its smaller size and protoconch only ornamented by one-rather than two spiral cords.
This species was quoted by Jousseaume (1896) as *Viriola triliratus*

Genus ***Mastonia*** Hinds, 1842.
Type species: *Triphoris ruber* Hinds, 1843 (by subsequent designation). Recent, New Ireland, Pacific Ocean .

Mastonia aegle **Jousseaume, 1884.**

Fig. 56

Mastonia aegle Jousseaume 1884: 256, pl. IV, fig. 12.

Type locality. New Caledonia and Bourbon Isl.

Type material. 4 lots labelled syntypes are in MNHN. One (MNHN 0741) from "Bourbon Isl.", without any other data, contains a single complete specimen, its protoconch consisting of 3.5 whorls ornamented with a single spiral cord crossed by close-set axial riblets (Fig. 56). This is the specimen refered by Jousseaume. A second lot (MNHN 0738) contains 7 specimens, only one of which has a partly broken protoconch of 3 whorls ; 4 labels in the lot , mentioning either Nouvelle Calédonie, or Bourbon (but Jousseaume wrote he had only seen one specimen from Bourbon); the data of this lot should then be considered as uncertain. The third lot MNHN 0740 labelled by Jousseaume “Type. Nouvelle Calédonie”, contains 6 specimens, mostly of the same size as those from Reunion, although two are larger (5-6 mm). The fourth lot contains 2 specimens labelled by Jousseaume “syntypes, Nouvelle, Calédonie”.

Comments. We have not found on Reunion any specimen that matches Jousseaume’s description or type material.

Mastonia interpictus **Jousseaume, 1896.**

Figs 34-36, 42, 57

Mastonia interpictus Jousseaume 1896: 74.

Type locality. Djibouti and Bourbon.

Type material. The holotype, MNHN 1575 has a broken protoconch (Fig. 42). Teleoconch whorls bearing 2 subequal beaded spiral cords, 17/18 beads per whorl, and a fine smooth spiral cord between them on last whorls.

Figures 45-59

45. *Triphora adamsi* (Deshayes, 1863). Holotype MNHN 1579. Reunion, 4 mm; **46.** *Triphora angustissima* (Deshayes, 1863). Neotype MNHN 9488. Cape La Houssaye, Saint Paul, Reunion, in sand at 15 m, 5.3 mm; **47.** *Triphora crenulata* (Deshayes, 1863). Cape La Houssaye, Saint Paul, Reunion, depht 20 m, 13 mm; **48.** *Triphora distincta* (Deshayes, 1863). Neotype MNHN 9489, Reunion, cape La Houssaye, Saint Paul, depht 10 m, 6.3 mm; **49-50.***Triphora formosa* (Deshayes, 1863). **49.** Neotype MNHN 9487. Reunion, cape La Houssaye, Saint Paul, depht 10-12 m, 6.2 mm; **50.** Colour form, collection MJ. Cape La Houssaye, Saint Paul, Reunion, depht 20m, 7 mm; **51.** *Triphora hindsi,* (Deshayes, 1863). Neotype MNHN 9490. Cape La Houssaye, Saint Paul, Reunion, depht 10m, 7 mm; **52.** *Triphora mirifica* (Deshayes, 1863). Neotype MNHN 9491. Cape La Houssaye, Saint Paul, Reunion, depht 10 m, 7mm; **53.** *Triphora pupaeformis* Deshayes, 1863. Neotype MNHN 9492. Cape La Houssaye, Saint Paul, Reunion, depth 20 m, 4.5mm; **54.** *Triphora reevei* (Deshayes, 1863). Neotype MNHN 9493. Cape La Houssaye, Saint Paul, Reunion, depth 15 m, 6 mm; **55.** *Triphora trilirata,* (Deshayes, 1863), Cape La Houssaye, Saint Paul, Reunion, depht 20 m, 8.9 mm; **56.** *Mastonia aegle* Jousseaume, 1884. Syntype MNHN 0741, Bourbon, 3.9mm; **57.** *Mastonia interpictus* Jousseaume, 1896. Cape La Houssaye, Saint Paul, Reunion, depht 20m, 8 mm; **58.** *Mastoniaeforis chaperi* Jousseaume, 1884. Cape La Houssaye, Saint Paul, Reunion,15 m, 6.5 mm; **59.** *Obesula borbonica* Jousseaume, 1896. Cape La Houssaye, Saint Paul, Reunion, depth 20 m. Coll. MJ, 3.5 mm.

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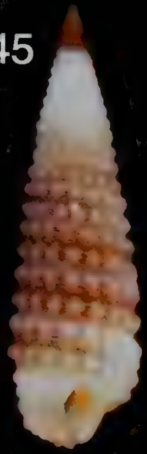

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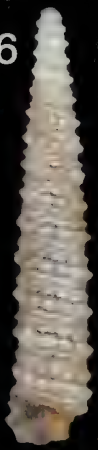

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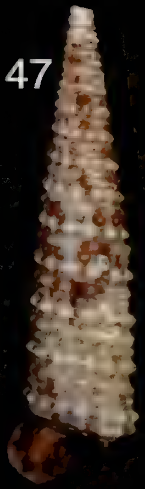

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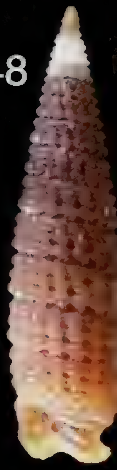

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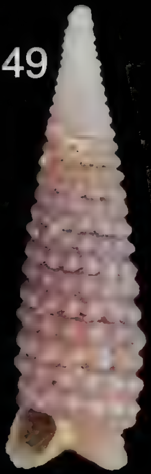

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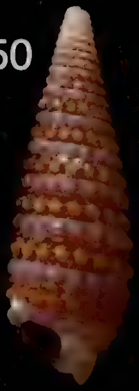

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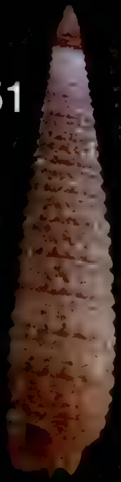

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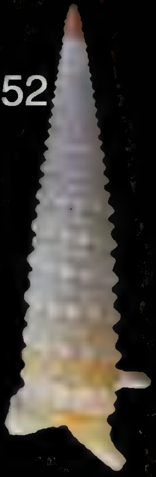

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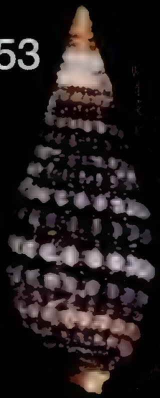

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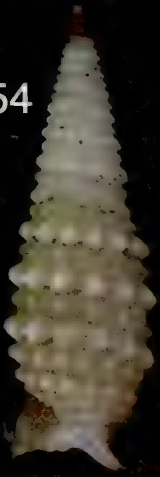

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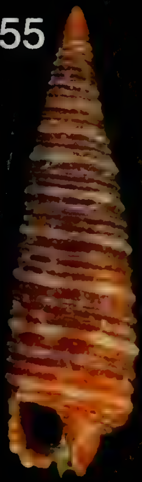

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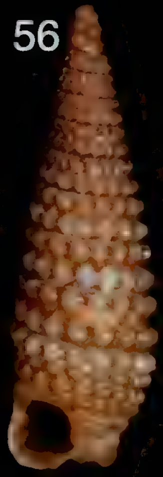

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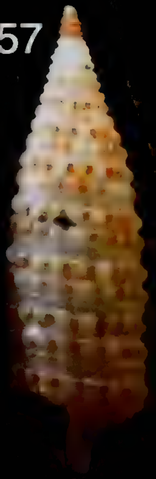

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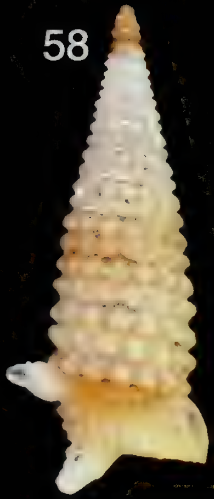

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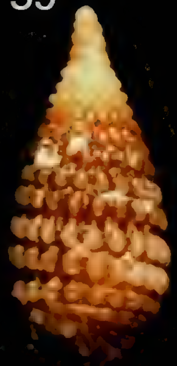

Comments. The species is rather common in Reunion and cannot be confused with any other species. Its protoconch is of 4 whorls bearing 2 spiral carinas crossed by numerous axial riblets. Voucher specimen Figs 34-36, 57.
This is a valid species.

Genus ***Mastoniaeforis*** Jousseaume, 1884.
Type species: *Mastoniaeforis chaperi,* Jousseaume, 1884 (by original designation). Recent, Reunion, Indian Ocean .

Mastoniaeforis chaperi **Jousseaume, 1884.**
Figs 31-33, 43, 58

Mastoniaeforis chaperi Jousseaume 1884: 243, pl. IV, figs 4-5.

Type locality. Bourbon Isl.

Type material. Type material MNHN 0478 from Bourbon Isl. It consists of one shell labelled syntype (Fig. 43) with broken apex, no protoconch and teleoconch whorls bearing 2 beaded spiral cords, 15-16 beads per whorl, beads subequal on the two rows and not axially aligned, anal canal present.

Comments. The species is common in Reunion where I have seen more than 100 specimens. The protoconch comprises 4 whorls, bearing one spiral carina crossed by numerous axial riblets, and a rounded smooth apex. A third canal is present. Voucher specimen for SEM Figs 31-33, 58.
Valid name.

Genus ***Obesula*** Jousseaume, 1896.
Type species: *Mastonia obesula* Jousseaume, 1884 (by subsequent designation). Recent, New Caledonia, Pacific Ocean.

Obesula borbonica **Jousseaume, 1896.**
Figs 44, 59

Obesula borbonica Jousseaume 1896: 75.

Type locality. Red sea and Bourbon.

Type material. One lot from « Bourbon Isl.» MNHN 0728 consists of two syntypes, one with broken apex (no protoconch whorl), the other (Fig.44) with broken apex, but with a small part of protoconch left, showing 2 spiral cords crossed by close-set axial riblets, the abapical cord being stronger. Teleoconch whorls ornamented with 2 beaded spiral cords.

Comments. The species is uncommon in Reunion, where I have collected only 15 specimens, one of them with a complete protoconch (Fig. 59), which was regrettably broken before a SEM micrograph could be prepared.
This is a valid species.

ACKNOWLEDGEMENTS

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A new species of *Cosmioconcha* (Gastropoda: Columbellidae) from the northern Gulf of Mexico

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KEYWORD. Gastropoda, Columbellidae, *Cosmioconcha*, Gulf of Mexico.

ABSTRACT. A new species of *Cosmioconcha*, dredged off the Alabama coast, northern Gulf of Mexico, is described and compared to its congeners. It is the smallest of all western Atlantic species of *Cosmioconcha* heretofore described.

INTRODUCTION

The Biology Department at the University of Louisiana at Lafayette has conducted a series of dredging cruises in the Gulf of Mexico. An important objective of these cruises has been to try to have a better understanding of the biodiversity of the Gulf. This objective has been largely met with the methodical study of the material collected, particularly the micro-mollusks extracted from the sediment. The dredged material has brought to light many molluscan species previously unrecorded for that body of water (see García 1999b, 2000, 2002, 2003, 2007; and García & Lee 2002, 2003), as well as a number of previously un-described species (see García 1999a, 2005, 2006a, 2006b).

In the past year three new species of *Cosmioconcha* from the western Atlantic have been described. Two of these species, *Cosmioconcha rikae* Monsecour & Monsecour, 2006 and *C. geigeri* García, 2006, inhabit the Gulf of Mexico. A third species, *Cosmioconcha nitens* (C. B. Adams, 1850), also inhabits the Gulf. In a cruise conducted during June-July, 2006, two empty, but well- preserved shells of another species of *Cosmioconcha* were obtained with a box dredge off the coast of Alabama; and searching through material collected in earlier cruises uncovered a third specimen dredged in 2004 off the Louisiana coast.

Taking into consideration the new species described herein, a full 50% of the described species of *Cosmioconcha* from the western Atlantic will have been reported from the Gulf of Mexico, and more than 35% will have been described in the very recent past. These facts speak for the success of the work that has been done in the Gulf in recent years, as well as for the potential for many more future discoveries.

All cruises have been conducted on board the R/ V "Pelican", a research vessel owned and operated by LUMCON, the Louisiana Universities Marine Consortium.

Abbreviations

ANSP: The Academy of Natural Sciences, Philadelphia, Pennsylvania, USA.
USNM: National Museum of Natural History, Smithsonian Institution, Washington, DC, USA.
EFG: author's collection
dd: empty shell(s)

SYSTEMATICS

Superfamily **BUCCINOIDEA** Rafinesque, 1815
Family **COLUMBELLIDAE** Swainson,, 1840
Subfamily **ATILIINAE** Cossman, 1901
Genus ***Cosmioconcha*** Dall, 1913
Type species: *Buccinum modestum* Powys, 1835, by original designation.

***Cosmioconcha nana* n. sp.**

Figs 1-7

Type material. Holotype ANSP 413705; length 4.6 mm, width 2mm (Figs. 1-6), 1 paratype USNM 2043333 (Fig. 7), 1 paratype EFG 25195.

Type locality. Northern Gulf of Mexico; off Alabama, 29°24.43'N, 87°58.63'W, 74-72 m.

Material examined. Alabama: 29°24.43'N, 87°58.63'W, 74-72 m, 2 dd (holotype (Figs. 1-6), 1 paratype (Fig. 7)). **Louisiana**: Sackett Bank, 28°38.16'N89°33.19'W, 60-70 m., 1 dd (paratype 2).

Distribution. North-central Gulf of Mexico, off Alabama and Louisiana, 60-74 m.

Description. Holotype 4.7 mm in length, strong, fusiform (width/ length ratio 0.43 mm) (Figs. 1-6). Protoconch paucispiral, of 1.75 whorls, smooth, white, becoming rust-colored towards end of last whorl (Fig. 4). Transition between protoconch and teleoconch sharply marked by an abrupt change in color and ornamentation (Fig. 4). Teleoconch of just over 3 whorls; first whorl almost flat-sided; following whorls increasing in convexity. Suture deep, channeled. Axial sculpture of few, sporadically placed, growth scars (Fig. 2); one or two growth scars per whorl; numerous, axially oriented microscopic threads give the shell surface a wrinkled appearance (Fig. 5). Spiral sculpture of incised, punctate spiral grooves; 9 such grooves on first whorl, rapidly increasing in number on later whorls; about 12 strong spiral cords appearing at anterior end of last whorl; cords becoming slightly nodulose when crossed by axial threads. Outer lip strengthened by a moderately strong, wide varix (Fig. 2); ornamentation of last whorl continuing over surface of varix. Aperture elongate-ovate, approximately half the length of the shell; inner outer lip showing 10 weak denticles; columella with a slight swelling at anterior end, followed posteriorly by a sharp, conspicuous denticle (Fig. 6); otherwise smooth. Anterior canal short, wide. Shell color creamy white, with tan, squarish markings that tend to form a checkered pattern at suture and at periphery of last whorl.

Discussion. Paratype 1 is slightly larger than the holotype, measuring 5 mm in length and 2.1 mm in width. It has all of the characters of the holotype, including the rust-colored coloration at the end of the protoconch, as well as the conspicuous denticle near the base of the parietal wall. Paratype 2, the Louisiana specimen, measures 4.2 mm in length but is chipped at the anterior end. It is also slightly more eroded than the Alabama specimens; otherwise, it shows all of the important morphological characters and markings of the other two type specimens.

There are seven columbellid taxa from the western Atlantic that have been assigned to *Cosmioconcha*: *C. nitens* (C. B. Adams, 1850), *C. calliglypta* (Dall & Simpson, 1901), *C. helenae* (Costa, 1983), *C. humfreyi* Jong & Coomans, 1988, *C. dedonderi* Monsecour & Monsecour, 2006, *C. rikae* Monsecour & Monsecour, 2006, and *C. geigeri* García, 2006. *Cosmioconcha nitens*, *C. rikae* and *C. geigeri* are known to inhabit the Gulf of Mexico.

Cosmioconcha nitens has a multispiral protoconch, lacks the conspicuous columellar denticle, has a smooth surface except for the spiral cords at the base of the last whorl, and has a proportionately longer aperture; *C. rikae* is axially ribbed and has a nodulose spiral cord anterior to the suture; and *C. geigeri* has a white protoconch, stronger axial sculpture, a different spiral sculpture, and a milky-white band at suture. These three species are larger than *Cosmioconcha nana* n. sp.

Cosmioconcha calliglypta, a southern Caribbean species, is stouter, and has stronger sculpture. *Cosmioconcha helenae*, a Brazilian species, has 6 whorls, is axially ribbed, and is nodulose at suture. *Cosmioconcha humfreysi*, a species described from Aruba, is more delicate, with a row of white spots above the suture, and has 9 whorls. *Cosmioconcha dedonderi*, from the southwestern Caribbean, has a different color pattern and a cancellate sculpture. All of these species are also larger in size than *Cosmioconcha nana* n. sp.

In his dissertation on Brazilian columbellids, Costa (2005: 152-156) describes, without naming them, two species from Brazil: *Cosmioconcha* "sp. 1", with axial costae, is similar to *C. rikae* Monsecour & Monsecour, 2006 in general shape and sculpture. *Cosmioconcha* "sp. 2" is similar in size to the new species; however, it is differently colored, has wider shoulders, has a subsutural spiral sulcus, and different surface ornamentation.

Etymology. From the Latin *nanus* (noun, meaning a dwarf), in reference to the relatively small size of the species when compared to its congeners. It is used here as an adjective, meaning "of small size."

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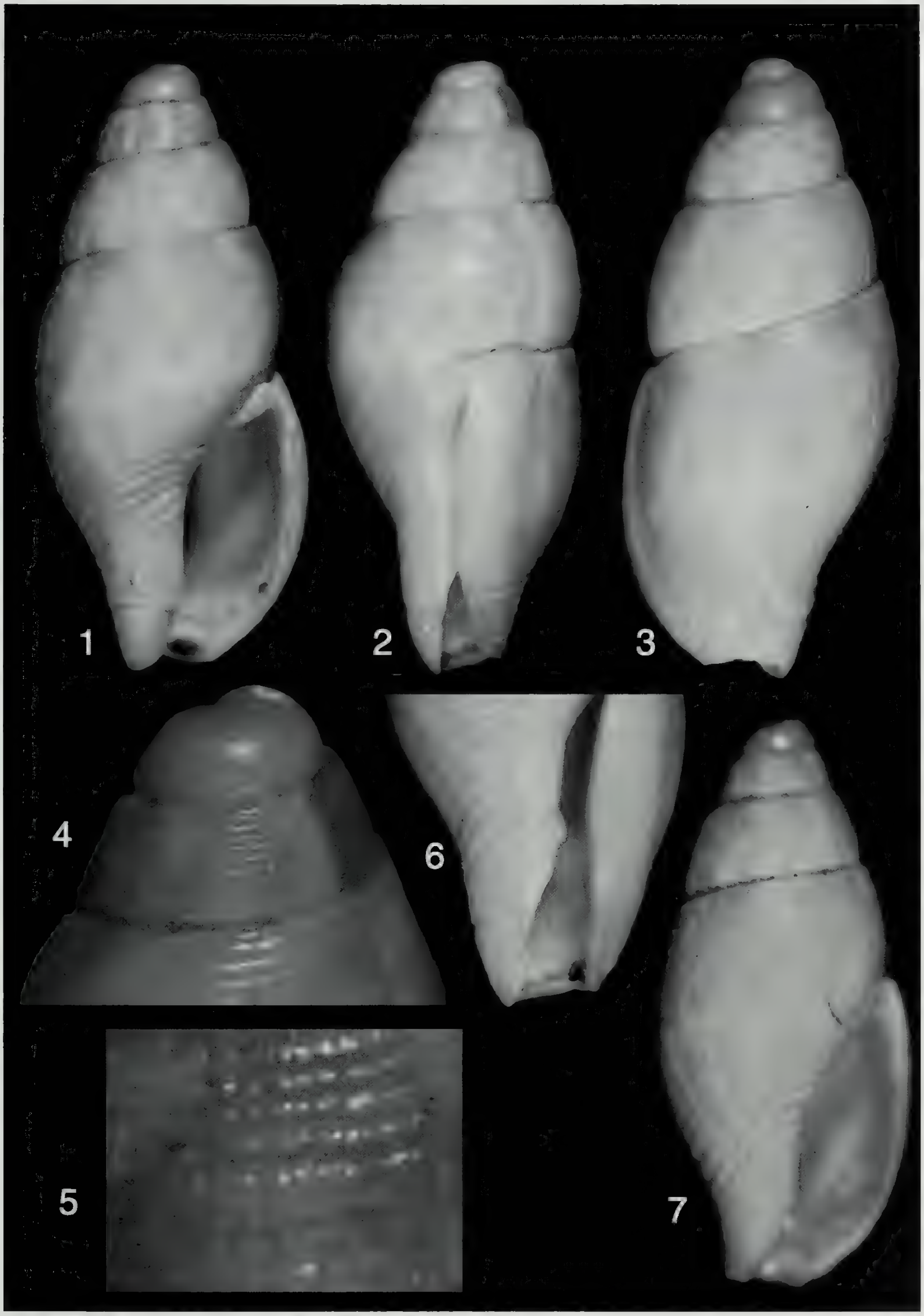
Figures 1-7

1-7. *Cosmioconcha nana* n. sp., off Alabama, 29°24.43'N, 87°58.63'W, 74-72 m. **1-6.** Holotype ANSP 413705; length 4.6 mm, width 2 mm; **7.** Paratype 1USNM 2043333, length 5 mm.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Les espèces invasives de mollusques en Méditerranée

Conférence donnée par les auteurs à l'occasion du 40ème anniversaire de la Société Belge de Malacologie, le samedi 25 novembre 2006 à l'Institut royal des Sciences naturelles de Belgique.

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MOTS CLEFS. Mollusca, Méditerranée, espèces invasives, revue.

KEY WORDS. Mollusca, Mediterranean Sea, invasive species, review.

RESUME. Diverses voies potentielles d'invasion de mollusques étrangers en Méditerranée sont exposées. Celles-ci sont illustrées par nos données personnelles. Une attention particulière est portée aux espèces lessepsiennes du golfe d'Iskenderun (Turquie) et des régions adjacentes (liste des espèces de Méditerranée orientale en fin d'article).

ABSTRACT. The invasive molluscs species in the Mediterranean Sea. Different potential means of introduction of alien species of molluscs into the Mediterranean Sea are presented. They are illustrated by our personal data. Emphasis is put on the lessepsian species present in the Gulf of Iskenderun (Turkey) and adjacent areas (list of the species of the Eastern Mediterranean enclosed at the end of the publication).

Navigation is continuously increasing. Ships from all over the world are entering the Mediterranean Sea. Release of their ballast waters is one of the main causes of introduction of alien species. These invasive species will only be able to survive and to settle if they find a favorable environment (temperature, light, salinity, food, support, absence of specific predators…).

Molluscs introduced for farming have a better chance to establish themselves in and out of the shellfish farm. In fact they have been selected for their potential capabilities to adapt to their new environment. Importation of species for aquaculture is not always mono-specific. Opportunistic species accompany the commercial mollusc and will establish themselves into the culture area but they will also colonize adjacent regions.

Lessepsian species entering the Mediterranean Sea via the Suez Canal represent the bulk of the invasive species. They can be found mainly along the Levantine coasts where the ecological conditions are more or less similar to those of the Red Sea. A quick look below the surface of the sea in these areas confirms the extension of this colonization. Some of the invasive species are now dominant in the coastal submarine landscape. The future enlargement of the Suez Canal will certainly increase this flow of invaders.

Present climatic changes, which increase the water surface temperature, will probably allow an extension of the lessepsian migrants towards the Western Mediterranean.

Colonization via the Suez Canal is a dynamic process and an exhaustive inventory of Red Sea migrants will never be complete. We are witnessing here a faunal modification which happens live and is thus an exciting phenomenon.

INTRODUCTION

La Méditerranée est une mer plus ou moins "fermée". Cela délimite un cadre rigide pour réaliser l'inventaire des espèces qui la peuplent et par conséquent pour identifier la présence d'espèces invasives d'origines diverses. A l'ouest, elle s'ouvre sur l'océan Atlantique par le détroit de Gibraltar. Du côté de la mer Noire, certains situent la limite de la Méditerranée aux Dardanelles, d'autres y incluent la mer de Marmara et repoussent sa frontière orientale jusqu'au Bosphore. A Port Saïd, le canal de Suez lui donne accès à la mer Rouge.

Bien sûr, la Méditerranée n'a pas toujours été telle qu'elle se présente aujourd'hui. Lors du fractionnement de la Pangée en deux grands continents, il y a plus de 200 millions d'années, naquit la Mésogée. Celle-ci se divisa ensuite en un océan

Proto-Atlantique à l'ouest et à l'est en une étendue d'eau nommée Téthys. Au cours du Miocène (- 17 Ma) un déplacement de la plaque de l'Afrique a provoqué la fermeture de la mer Téthys à l'est, au niveau du Moyen-Orient actuel, après avoir formé, à l'ouest, le détroit de Gibraltar. La Méditerranée était née. Il y a 5 millions d'années la communication avec l'océan Atlantique fut momentanément interrompue, période durant laquelle cette mer fut presque totalement asséchée et où seuls persistaient quelques "bassins" hypersalés (Ekman, 1953). Au Pliocène supérieur, des variations du niveau des mers ont établi des contacts successifs entre la Méditerranée et la mer Rouge permettant ainsi divers échanges faunistiques (Fishelson, 2000).

Nous ne remonterons pas si loin dans le temps pour commenter la composition de la faune méditerranéenne actuelle. Nous nous focaliserons sur l'époque récente durant laquelle plusieurs événements majeurs ont favorisé l'introduction d'espèces étrangères en Méditerranée.

- Depuis la fin du 15^e siècle, il y eut le développement croissant de la navigation et l'arrivée en Méditerranée de bateaux sans cesse plus grands, capables de faire aujourd'hui d'immenses trajets autour du globe.
- Au 19^e siècle, on entreprit le percement du canal de Suez. La réalisation de cet ouvrage a permis l'établissement d'une communication maritime permanente entre la Méditerranée et la mer Rouge.
- Au 20^e siècle, il y eut le développement de la conchyliculture qui favorisa l'importation à grande échelle d'espèces exotiques de mollusques.
- Il y a enfin la multiplication croissante d'aquariums marins desquels certaines espèces peuvent s'évader dans le milieu naturel environnant. On se souviendra de l'épisode marquant du début des années 1980, lorsqu'un laboratoire marin a laissé échapper l'algue *Caulerpa taxifolia* (Vahl) C. Agardh, 1817. Elle s'est rapidement multipliée et a envahi les fonds marins très loin de la zone de sa première implantation (Boudouresque et al., 1992). Cette invasion a exercé une pression importante sur les écosystèmes locaux en mettant en compétition l'intruse et les herbiers d'origine. Il s'en est suivi une modification de la composition des espèces qui leur étaient inféodées.

Pour survivre, s'établir, et coloniser de nouvelles zones, dans un milieu qui n'est pas le leur, les espèces invasives de mollusques doivent posséder des caractéristiques particulières.

- Les espèces se reproduisant par larves planctoniques peuvent parfois se déplacer sur de grandes distances. Ces larves peuvent être emportées par les courants marins et envahir des zones très loin de leur milieu d'origine. Néanmoins, le risque est grand de terminer le voyage dans des régions non propices à leur installation.
- Les espèces à développement direct colonisent de nouveaux territoires, de proche en proche, avec un avantage: celui de déjà "connaître" le milieu adjacent.
- Les espèces qui s'installent avec succès sont aussi celles qui tolèrent de grandes variations de leur environnement, comme des modifications de température, de salinité ou de luminosité. Leur capacité d'adaptation à de nouveaux écosystèmes, à un régime alimentaire différent, aux substrats disponibles et aux polluants environnants favorise un établissement durable. L'absence de prédateurs spécifiques joue également un rôle décisif dans la réussite d'une nouvelle implantation.

D'autre part, les voies d'introduction qu'empruntent les mollusques influencent également leurs chances de s'installer avec ou sans succès dans un nouveau milieu.

- Les espèces de mollusques apportées par la voie maritime ont une probabilité d'implantation réussie aléatoire. Il arrive que l'environnement dans lequel elles aboutissent ne soit pas propice à leur installation. L'introduction d'un nombre insuffisant d'individus génétiquement différents peut être à l'origine d'un échec de l'implantation. Cependant, la pression environnementale sur un petit nombre d'individus transplantés peut donner naissance à de nouvelles populations en voie de spéciation (Boero, 2002).
- Les espèces empruntant le canal de Suez comme voie d'accès à la Méditerranée s'établissent de préférence le long des côtes levantines, là où les conditions de températures ressemblent le plus à celles de la mer Rouge.
- Les espèces introduites en vue de l'aquaculture ont plus de chance de réussir leur acclimatation puisqu'elles sont sélectionnées pour leurs capacités potentielles à s'établir dans leur nouveau milieu.

La CIESM (Commission Internationale pour l'Exploration Scientifique de la Méditerranée), dont le quartier général est établi à Monaco, a entre autres buts celui de recenser toutes les espèces invasives en Méditerranée. Ce travail a fait l'objet de publications pour les poissons (Golani et al., 2002) et pour les invertébrés, tels que les crustacés (Galil et al., 2002) et les mollusques (Zenetos et al., [2003] 2004). Ce troisième volume de l'atlas des espèces exotiques de Méditerranée et les travaux de Mienis (2004) donnent accès à la liste la plus complète des espèces invasives répertoriées à ce jour en Méditerranée. La rédaction du présent travail est basée sur l'ensemble de nos récoltes personnelles et ne représente pas un inventaire exhaustif des espèces invasives. Nous n'abordons d'ailleurs ici que les bivalves et les gastéropodes limités aux espèces pourvues d'une coquille.

LES VOIES D'ACCES A LA MEDITERRANEE

Différentes voies d'accès potentielles sont examinées ci-dessous. Pour certaines, il existe un lien direct entre un événement déterminant et l'arrivée d'un envahisseur en Méditerranée. Pour d'autres, il s'agit d'hypothèses, le mode ou la voie d'invasion n'étant pas identifié avec certitude. Enfin, il est possible que toutes les voies potentielles d'accès n'aient pas encore été découvertes.

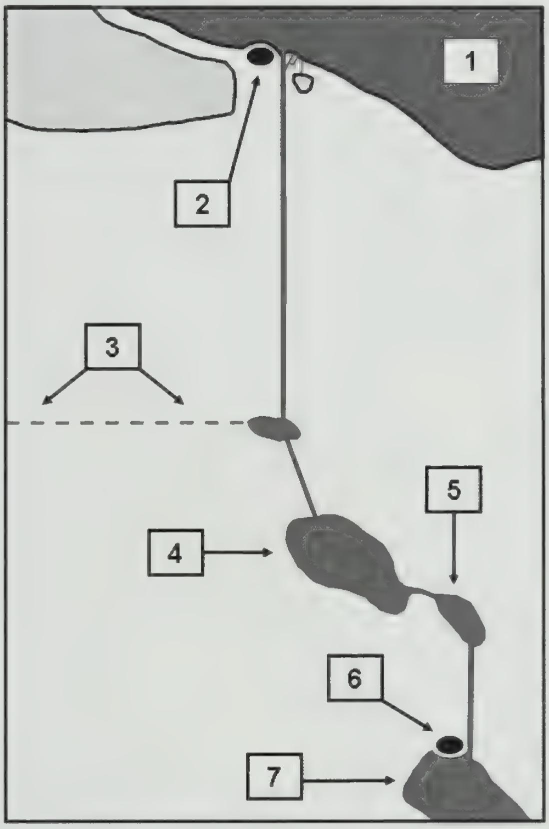
Les voies d'accès géographiques naturelles

Les voies d'accès naturelles à la Méditerranée se situent à Gibraltar et au niveau de la mer de Marmara.

- Dans le détroit de Gibraltar, la Méditerranée coule en profondeur vers l'océan et les eaux de surface de l'océan entrent en Méditerranée (Bray et al., 1995). Ces courants brassent des quantités d'eau importantes en mer d'Alboran (Méditerranée) et au sud de la péninsule ibérique (océan Atlantique). Cette région est riche en espèces endémiques. Il existe aussi des espèces qui depuis des siècles vivent de part et d'autre du détroit. On parlera dans ce cas d'expansion naturelle entre zones contigües plutôt que d'invasion.
- Au niveau de la mer de Marmara, la mer Noire coule en surface vers la Méditerranée et cette dernière, évolue en profondeur vers la mer Noire (Leier, 2001; Kideys, 2002). Historiquement, une partie de la faune de la mer Noire est d'origine méditerranéenne. Elle s'y est installée lorsque les deux mers sont entrées en communication voici bien longtemps. Etant donné la pauvre biodiversité et la faible salinité de la mer Noire, on n'observe pas de migrations significatives de mollusques vers la Méditerranée. Les conditions écologiques de ces deux mers sont pour beaucoup d'espèces bien trop différentes. Par contre, certaines espèces invasives ont réussi à s'adapter aux conditions particulières de la mer Noire (Çeviker, 2002a). On retrouve sur les côtes roumaines (Constanta) des espèces comme *Anadara inaequivalvis* (Bruguière, 1789) - Arcidae indo-pacifique et *Mya arenaria* Linnaeus, 1758 (Fig. 4) - Myidae d'origine nord-atlantique.

Une voie d'accès géographique artificielle

Le canal de Suez relie aujourd'hui la Méditerranée à la mer Rouge (Carte 1). Il a été creusé sous la direction de Ferdinand de Lesseps et inauguré en 1869. Depuis cette époque, il constitue une voie d'accès permanente à la Méditerranée. Chaque année, plus de 20.000 navires empruntent son passage. Ce canal est un vecteur de migration de mollusques d'une mer à l'autre. La colonisation "naturelle" est le fait d'espèces se déplaçant par leurs propres moyens. Toute "naturelle" soit-elle, elle trouve cependant son origine dans un acte humain qui est celui d'avoir relié entre elles deux mers sans contact depuis des temps lointains. Les espèces qui entrent en Méditerranée par le canal de Suez sont appelées "lessepsiennes". Le terme est inspiré du nom de Ferdinand de Lesseps qui fut le concepteur de ce canal. Pour mériter cette appellation, l'espèce doit à la fois se retrouver en mer Rouge, dans le canal de Suez et en Méditerranée. Les espèces effectuant le trajet migratoire en sens inverse sont appelées "anti-lessepsiennes". De nombreux exemples de ce phénomène de migration inverse sont rapportés dans la littérature (Barash & Danin, 1987). Ils montrent que les colonisations peuvent évidemment se produire dans les deux sens. La Méditerranée peut servir, elle aussi, de base arrière à des mollusques envahisseurs de la mer Rouge. Parfois la situation est moins claire : *Smaragdia souverbiana* (Montrouzier, 1863) - Neritidae - (Fig. 3) est un gastéropode de mer Rouge; on ne le signale momentanément pas dans le canal de Suez, mais il est bien présent le long des côtes orientales de Turquie (Liman Kalesi et Taşucu, récoltes personnelles: spécimens vivants dans les herbiers à quelques décimètres de profondeur). Il n'est donc pas certain que l'espèce ait migré d'elle-même via le canal; son mode d'introduction reste encore sujet à discussion.



Carte 1. Aperçu schématique du canal de Suez

1. Mer Méditerranée. - 2. Port Saïd. - 3. Canal d'eau douce. - 4. Great Bitter Lake. - 5. Small Bitter Lake. - 6. Port Suez. - 7. Mer Rouge.

Hoffman et al. (2006) donnent des informations concernant des coquilles présentes dans le canal de Suez ainsi que dans le "Great Bitter Lake" (situé aux deux tiers du chemin entre la Méditerranée et la mer Rouge). Quoiqu'encore fort salé, ce lac pourrait être considéré comme la "salle d'attente" des migrants potentiels qui ne sont pas encore présents en Méditerranée. Il ne faut pas oublier que lors de l'ouverture du canal, le "Great Bitter Lake" contenait de l'eau extrêmement salée et constituait une barrière naturelle au passage de nouvelles espèces venant de l'une ou de l'autre mer. De plus, le Nil apportait de grandes quantités d'eau douce entre ce lac et la

Méditerranée, ce qui constituait une seconde barrière naturelle aux migrations. Aujourd'hui, la situation a changé. Premièrement, la présence du barrage d'Assouan a fortement limité l'apport d'eau douce dans le delta du Nil et par conséquent dans le canal de Suez. Le bras du Nil nourrissant en eau douce l'extrémité du canal n'est quasiment plus fonctionnel (Leier, 2001). Deuxièmement, le canal a été élargit en 1981 et le sera encore d'ici 2010. Ces aménagements successifs augmentent le flux d'eaux marines entre les deux mers aujourd'hui reliées entre elles. Ceci explique le recensement sans cesse plus grand d'espèces lessepsiennes en Méditerranée. En outre, il ne faut pas négliger l'intérêt croissant des chercheurs pour cet important phénomène de migration animale.

Les voies d'accès maritimes

Le transport par l'intermédiaire de navires est souvent cité comme l'une des causes de l'essaimage de certaines espèces de mollusques.

- Des mollusques peuvent utiliser la coque des bateaux comme support pour leur développement. Il s'agit d'individus adultes incrustés ou de pontes attachées sous la ligne de flottaison. Ils peuvent de la sorte être transportés et coloniser de nouvelles régions loin de leur lieu d'origine.
- L'eau de mer aspirée pour remplir les ballasts des navires peut contenir des œufs, des larves, ou mêmes des coquilles adultes. Ces organismes sont transportés sur des milliers de kilomètres. S'ils survivent au voyage, ils peuvent être relâchés dans un autre lieu, au hasard d'une purge de ballasts, et y faire souche à condition de trouver un milieu propice à la poursuite de leur développement ou de leur vie (Zibrowius, 2002). Cette hypothèse a été formulée pour expliquer le passage de *Strombus persicus* Swainson, 1821 - Strombidae - (Fig. 1) du golfe Persique à la Méditerranée. Les navires accostant aux terminaux pétroliers du golfe d'Iskenderun (Turquie orientale) seraient à l'origine de l'introduction de l'espèce (Oliverio, 1995). Cependant, cette théorie a été récemment mise en doute (Gofas & Zenetos, 2003). *Thais lacera* (Born, 1778), Muricidae de l'océan Indien, illustre également une colonisation probable de ce type. Dans une deuxième étape, l'espèce aurait migré de la Méditerranée vers le canal de Suez pour atteindre secondairement le nord de la mer Rouge (Mienis, 1994). L'exemplaire vide illustré en Fig. 5 provient de Paphos (Chypre).

La voie d'accès aérienne

Certains oiseaux ont été cités comme probables vecteurs de transport de mollusques. Faber (1999) évoque le déplacement possible de juvéniles de *Cerastoderma glaucum* (Poiret, 1789) et de *Potamides conicus* (de Blainville, 1829) par la boue collée aux pattes de migrateurs fréquentant des zones marécageuses dans lesquelles ces espèces vivent. Il explique de la sorte leur présence dans un lac d'eau saumâtre voisin du Nil (lac Qarum) n'ayant jamais eu de communication avec une mer. Il est possible qu'un tel phénomène puisse se produire ailleurs.

Les aquariums et centres de recherches scientifiques

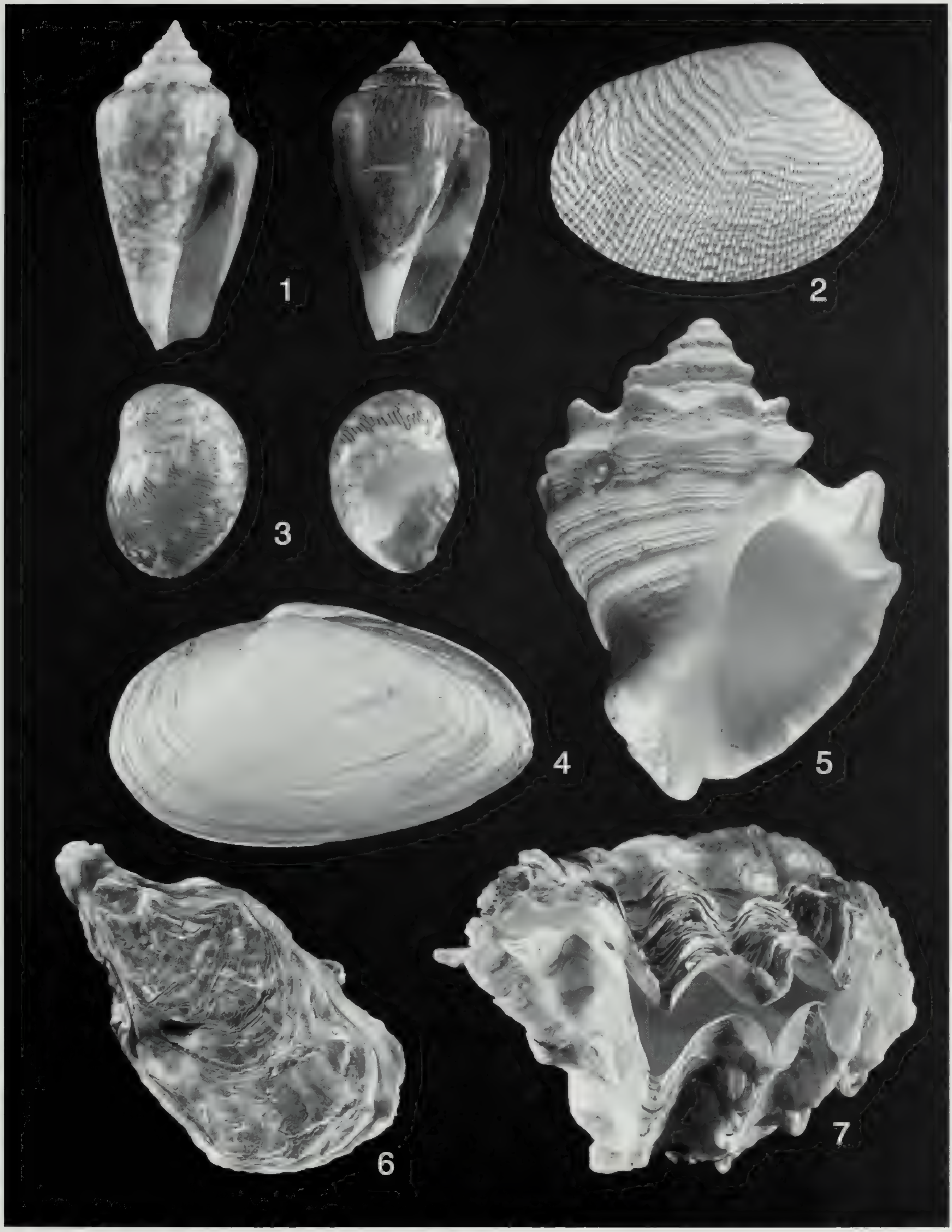
Outre l'introduction accidentelle (réussie) de l'algue *Caulerpa taxifolia* déjà mentionnée ci-dessus, on peut citer celle (probablement avortée) du nudibranche *Chromodoris quadricolor* (Rüppell & Leuckart, 1830). Il a été retrouvé une seule fois dans le nord de l'Italie et provenait plus que probablement d'un aquarium marin situé dans la région (Zenetos et al., [2003] 2004).

La conchyliculture

En Europe, depuis le début des années 1960, cette pratique est en croissance continue. Elle a donné lieu à l'installation délibérée en Atlantique et en Méditerranée de nombreux envahisseurs. Cette fois, la colonisation se produit de façon massive. Le but est évident: acclimater des espèces étrangères et les faire croître dans un autre milieu à des fins commerciales. On importe en un lieu prédéterminé une grande quantité d'individus dont certains finissent par s'échapper de leur zone de culture pour essaimer de proche en proche. Dans la majorité des cas, cet apport d'espèces étrangères n'est pas monospécifique. Il s'accompagne de la présence d'espèces opportunistes sans valeur commerciale qui à leur tour vont s'établir dans et en dehors des zones de culture. Il arrive aussi que l'on déplace des populations de mollusques d'un endroit à l'autre, soit pour initier la culture ailleurs, soit pour installer les mollusques dans un environnement de croissance plus favorable. En France, des huîtres sont ainsi déplacées de l'océan Atlantique vers la Méditerranée entrainant le transfert d'espèces associées qui peuvent à leur tour devenir invasives.

Figures 1 - 7

1. *Strombus persicus* Swainson, 1821 - Genadiou (Rhodes - Grèce), 44,0 x 22,2 mm et 40,7 x 21,3 mm. **2.** *Ruditapes philippinarum* (Adams & Reeve, 1850) - Goro (Adriatique - Italie), 35,6 x 25,7 mm. **3.** *Smaragdia souverbiana* (Montrouzier, 1863) - Liman Kalesi (Turquie), 5,4 x 4,3 mm et 4,8 x 3,6 mm. **4.** *Mya arenaria* Linnaeus, 1758 - Constanta (Roumanie), 72,8 x 42,5 mm. **5.** *Thais lacera* (Born, 1778) - Paphos (Chypre), 37,8 x 29,2 mm. **6.** *Crassostrea gigas* (Thunberg, 1793) - Karatas (Golfe d'Iskenderun - Turquie), 110,0 x 60,0 mm. **7.** *Crassostrea gigas* (Thunberg, 1793) - Aquilea (Adriatique - Italie), 70,0 x 66,0 mm.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- Les espèces destinées à l'élevage

- *Crassostrea gigas* (Thunberg, 1793). Cet Ostreidae a été importé du Pacifique Nord en France dans les années 1960 pour remplacer les populations atlantiques d'huîtres creuses [*Crassostrea angulata* (Lamarck, 1819)] décimées par des épizooties (Vidal, 2001). Par la suite, cette huître a été introduite dans les étangs du midi de la France et en Adriatique à des fins de culture. Spécimens en collection: Laguna di Ravenna, Lido di Sottomarina, Aquilea (Fig. 7), Grado (Italie - Adriatique), Gruissan, étangs de Mèze et de Leucate (sud de la France) et Karatas (Fig. 6) (Turquie). Cette dernière provenance confirme aujourd'hui l'expansion de l'espèce jusqu'à l'est de la Méditerranée.

- *Ruditapes philippinarum* (Adams & Reeve, 1850). Ce Veneridae de l'ouest de l'océan Pacifique, encore appelé palourde de Manille, a été introduit avec succès en Adriatique (Cesari & Pellizzato, 1985) et en France à des fins d'élevage. Il a très rapidement essaimé dans les régions avoisinantes. En Méditerranée, tout comme dans l'océan Atlantique, *Ruditapes philippinarum* entre en compétition directe avec l'espèce autochtone *Ruditapes decussatus* (Linnaeus, 1758). La densité de population de cette dernière diminue dans son milieu d'origine, jusqu'à disparaitre quasi totalement de certaines régions au profit de l'espèce allochtone. Ce fait est particulièrement marqué sur la façade atlantique de l'Europe. Spécimens en collection: embouchure du Pô [Italie - Adriatique (Fig. 2)] ; étang de Leucate (France); Istanbul (mer de Marmara - Turquie).

- Les espèces opportunistes accompagnantes

- *Haminoea callidegenita* (Gibson & Chia, 1989). Cet Haminoeidae de l'océan Pacifique a été importé dans l'Atlantique, en France et en Espagne avec des mollusques destinés à l'aquaculture. De là, il a été accidentellement exporté en Adriatique en même temps que la palourde de Manille (Alvarez et al., 1993). Spécimens en collection : Laguna di Ravenna (Fig. 8).

- *Crepidula fornicata* (Linnaeus, 1758). Ce Calyptraeidae a été importé des côtes atlantiques de l'Amérique du Nord vers l'Angleterre à la fin du 19^{e} siècle, à l'occasion de transferts d'huîtres. Il a fait route vers la France lors des mouvements de navires durant la seconde guerre mondiale. Ensuite, il a accompagné de manière massive *Crassostrea gigas* en provenance du Japon et de la Colombie Britannique (Blanchard, 1995). La biomasse des crépidules en Atlantique se chiffre localement en milliers de tonnes (Blanchard & Ehrhold, 1999). L'espèce a finalement été transférée dans le midi de la France lors des transports d'huîtres entre l'Atlantique et la Méditerranée. Spécimens en collection: Le Grau du Roi et zones ostréicoles de Gruissan et de l'étang de Thau (Fig. 9) (France). On note également une extension de l'espèce vers l'Espagne (spécimen en collection : Blanes).

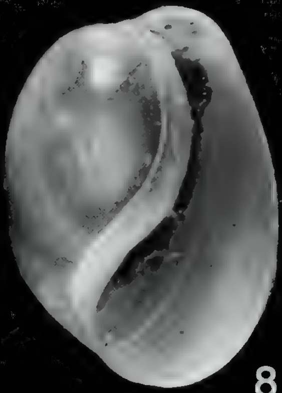
- *Xenostrobus securis* (Lamarck, 1819). Ce Mytilidae, établi dans la zone tropicale de l'océan Pacifique, a été signalé une première fois dans la lagune de Ravenna, puis s'est rapidement introduit dans le nord de l'Adriatique en se propageant sur les pilastres ("*bricoli*") de la lagune de Venise (Sabelli & Speranza, 1994). Il s'étend actuellement en grandes colonies dans le delta du Pô. Une nouvelle implantation massive est également signalée en France au Grau du Roi, où le mollusque cohabite avec un autre Mytilidae, *Musculista senhousia* (Benson in Cantor, 1842) (Russo, 2001). Spécimens en collection: marina di Ravenna - laguna di Caleri (Fig. 10) et Fusina (Italie - Adriatique).

COMBINAISON DES VOIES D'ACCES

Il est probable que certains mollusques puissent emprunter simultanément ou chronologiquement différentes voies d'accès. Une espèce peut s'introduire par le canal de Suez, faire souche le long des côtes levantines et être en même temps transportée à des endroits forts distants les uns des autres par la voie maritime. Les quelques exemples qui suivent en témoignent.

Figures 8 - 15

8. *Haminoea callidegenita* (Gibson & Chia, 1989) - Ravenna (Adriatique - Italie), 7,7 x 5,6 mm. **9.** *Crepidula fornicata* (Linnaeus, 1758) - Mèze (Etang de Thau - France), 74,3 x 52,8 mm. **10.** *Xenostrobus securis* (Lamarck, 1819) - Caleri (Adriatique - Italie), 28,9 x 14,4 mm. **11.** *Anadara inaequivalvis* (Bruguière, 1789) - Lido degli Estensi (Adriatique - Italie), 35,0 x 28,9 mm. **12.** *Pinctada radiata* (Leach, 1814) - Sidi Djemour (Djerba - Tunisie), 35,0 x 37,6 mm. **13.** *Musculista senhousia* (Benson in Cantor, 1842) - Balaruc les Bains (Etang de Thau - France), 11,1 x 19,9 mm. **14.** *Rapana venosa* (Valenciennes, 1846) - Tekirdag (Mer de Marmara - Turquie), 87,0 x 65,0 mm. **15.** *Erosaria turdus* (Lamarck, 1810) - Sidi Mansour (Golfe de Gabès - Tunisie), 50,3 x 31,5 mm.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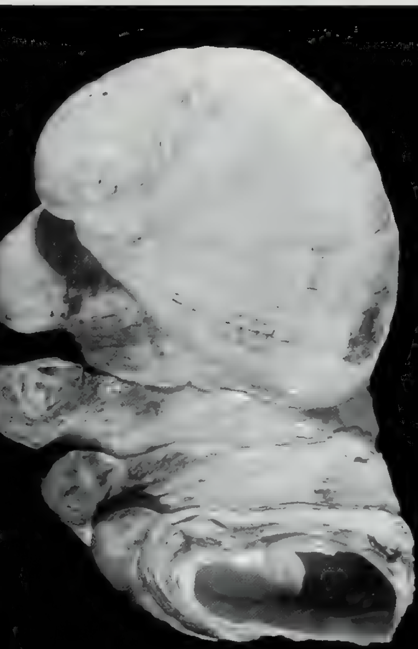
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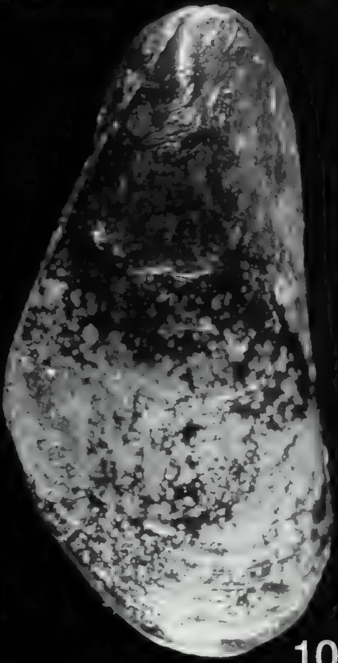
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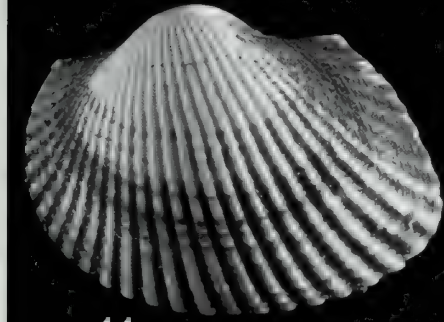
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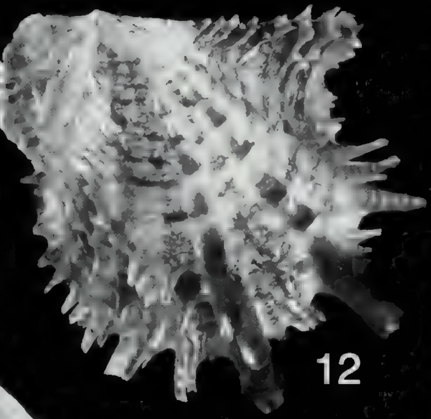
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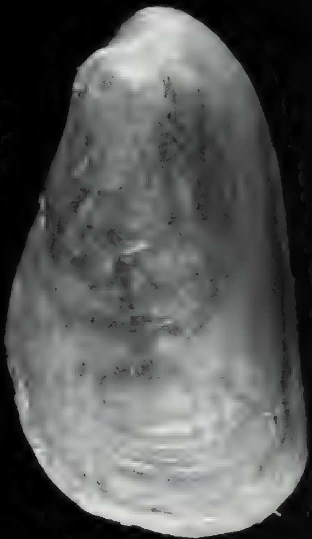
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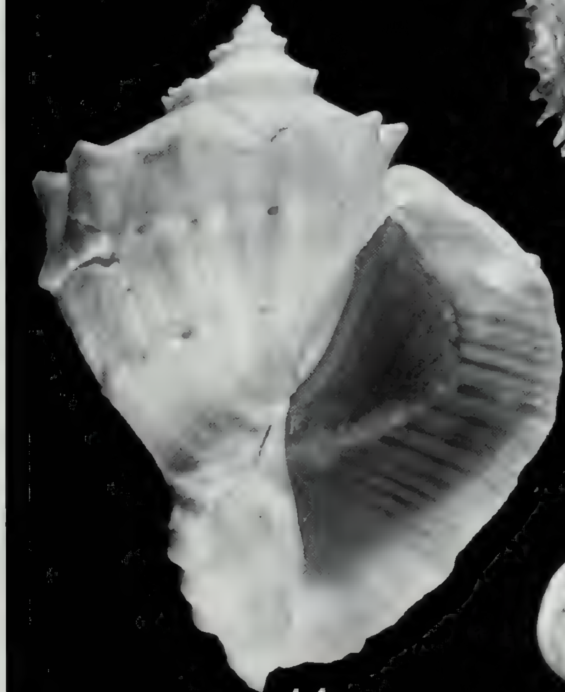
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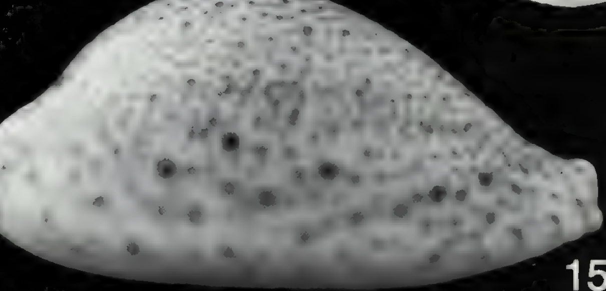
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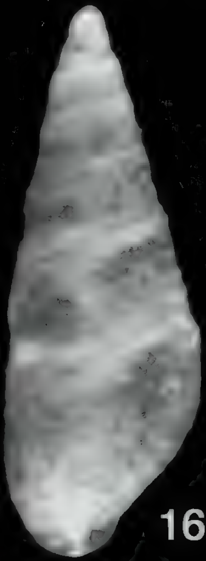
- *Anadara inaequivalvis* (Bruguière, 1789). Cet Arcidae indo-pacifique a été importé accidentellement en mer Adriatique, probablement par l'intermédiaire de bateaux. Il s'est développé exponentiellement dans le golfe de Venise et le long des côtes nord-est de l'Italie, région où sa biomasse est actuellement gigantesque. Il a ensuite été transplanté vers la Sicile, probablement avec des envois de *Chamelea gallina* (Linnaeus, 1758) - Veneridae destiné à l'aquaculture. Spécimens en collection: Chioggia, Grado, Cervia, Goro (estuaire du Pô), Lido degli Estensi (Fig. 11) en Italie (Adriatique); Rumeli Kavagi dans le Bosphore (Turquie).
- *Pinctada radiata* (Leach, 1814). L'extension de ce Pteriidae, dont la présence est déjà mentionnée en Egypte en 1874, semble actuellement couvrir l'entièreté du bassin oriental de la Méditerranée. Il y est apparu par colonisation naturelle au départ du canal de Suez (origine indo-pacifique) et / ou par apport anthropique pour la culture de perles. Spécimens en collection: La Laouza, Djerba (Fig. 12) et Iles Kerkennah (Tunisie); Bath of Aphrodite (Chypre); Side, Liman Kalesi, Taşucu, Narlikuyu et Burnas (Turquie).
- *Musculista senhousia* (Benson in Cantor, 1842). Ce Mytilidae de l'ouest de l'océan Pacifique (Fig. 13) est abondant dans les zones où se pratique l'aquaculture. Chaque année, son aire de répartition s'agrandit, comme en témoigne une collecte récente réalisée à Cagliari - sud de la Sardaigne (Delongueville & Scaillet, 2006a). Les premières introductions proviennent de la conchyliculture et les découvertes de la côte levantine sont le fait d'une migration en provenance du canal de Suez. Spécimens en collection: étangs de Leucate, de Thau, de Gruissan, les Saintes-Maries-de-la-Mer (Sud de la France) ; laguna di Ravenna, laguna di Venezia, embouchure du Pô (Adriatique) et Cagliari (Sardaigne).
- *Rapana venosa* (Valenciennes, 1846). L'arrivée de ce Muricidae de l'océan Pacifique en mer Noire (1946) et en mer Adriatique (1974), régions distantes entre elles de plus d'un millier de km, est très certainement le fait de deux événements successifs et distincts: l'introduction de larves planctoniques provenant de l'eau des ballasts de navires déversée en mer Noire (Kideys, 2002) et l'introduction de pontes accompagnant des produits d'aquaculture en Adriatique (Zenetos et al., 2005). Spécimens en collection: Rumeli Kavagi, Rumeli Fenner (confins du Bosphore); Tekirdag en mer de Marmara (Fig. 14); Rimini (Adriatique).
- *Erosaria turdus* (Lamarck, 1810) est considérée comme une espèce lessepsienne de Cypraeidae dont la présence est signalée en Israël, en Egypte et en mer Rouge (Zenetos et al., [2003] 2004). Depuis 2004, de nombreuses publications font état de sa présence dans le golfe de Gabès (Delongueville & Scaillet, 2004b) (Fig. 15) et plus particulièrement de la collecte d'individus vivants à Djerba - Tunisie (Wimart-Rousseau, 2004; Demartini, 2005; Boyer & Simbille, 2005). Rien n'explique, à l'heure actuelle, la présence de l'espèce dans cette région. S'agit-il d'une colonisation en provenance de la Libye et des côtes avoisinantes dont les données à ce sujet font défaut, ou d'un apport anthropique accidentel?
- *Fulvia fragilis* (Forskål, 1775). Ce Cardiidae de l'océan Indien est présent en Tunisie. A Djerba, il est rejeté en grande quantité sur la bande côtière de Fahmine (Fig.20). Il est également signalé dans la partie est de la Méditerranée et dans le canal de Suez. Comment a-t-il migré vers la Tunisie ? Des relevés faunistiques entre l'Egypte et Djerba font défaut. Un apport anthropique par des navires n'est pas à exclure. En effet, la présence de l'espèce a été sporadiquement signalée en Grèce (Vardala-Theodorou, 1999), en Espagne (Zenetos et al., [2003] 2004) et récemment en Italie dans le golfe de Naples (Crocetta, 2005). Spécimens en collection: Fahmine (Djerba - Tunisie).

VOIES D'ACCES INCONNUES

A titre d'exemples, les deux petites espèces suivantes, originaires de la région indo-pacifique, sont qualifiées de rares en Méditerranée; leur voie d'introduction reste à ce jour énigmatique.
- *Sticteulima lentiginosa* (Adams A., 1861). Cet Eulimidae (Fig. 16) rarement trouvé (Zenetos et al., [2003] 2004) a été également isolé par nos soins en 2005 parmi les concrétions extraites d'une vingtaine de *Spondylus spinosus* Schreibers, 1793 (Yumurtalik - 20 à 30 m de fond - golfe d'Iskenderun - Turquie). Sa présence serait liée à celle d'ophiurides.

Figures 16 - 24

16. *Sticteulima lentiginosa* (Adams A., 1861) - Yumurtalik (Golfe d'Iskenderun - Turquie), 1,6 x 0,6 mm. **17.** *Anadara demiri* (Piani, 1981) - Izmir (Mer Egée - Turquie), 33,1 x 24,2 mm. **18.** *Murchisonella columna* (Hedley, 1907) - Karatas (Golfe d'Iskenderun - Turquie), 1,6 x 0,6 mm. **19.** *Umbonium vestiarium* (Link, 1807) - Paphos (Chypre), 6,0 x 8,8 mm et 6,1 x 9,2 mm. **20.** *Fulvia fragilis* (Forskål, 1775) - Fahmine (Djerba - Tunisie), 18,9 x 18,8 mm. **21.** *Coralliobia madreporarum* (Sowerby, 1832) - Ravenna (Adriatique - Italie), 18, 4 x 15,2 mm. **22.** *Potamides conicus* (de Blainville, 1829) - Akko (Israël), 13,7 x 4,0 mm. **23.** *Erronea caurica* Linnaeus, 1758 - Haïfa (Israël), 37,6 x 21,0 mm. **24.** *Alvania dorbignyi* (Audouin, 1826) - Shavei Zion (Israël), 4,7 x 2,6 mm.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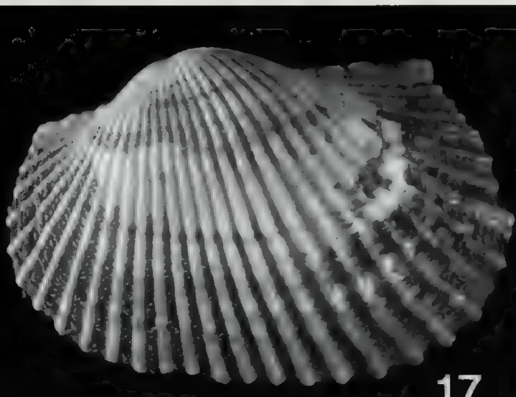
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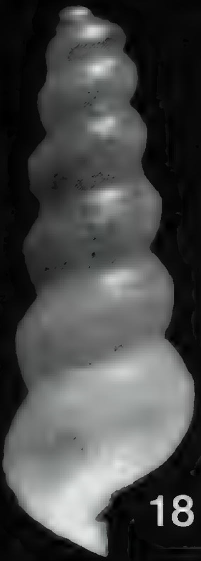
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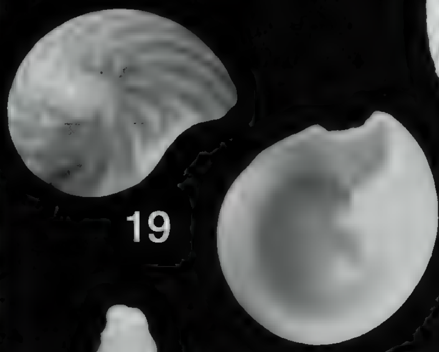
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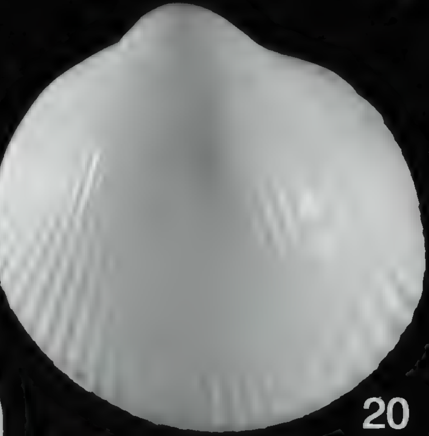
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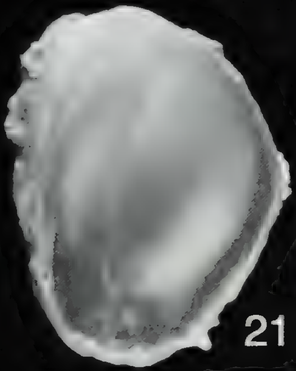
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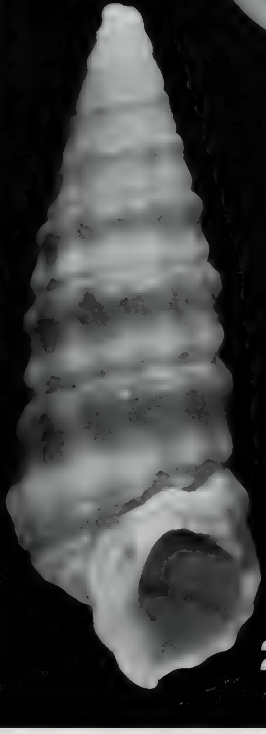
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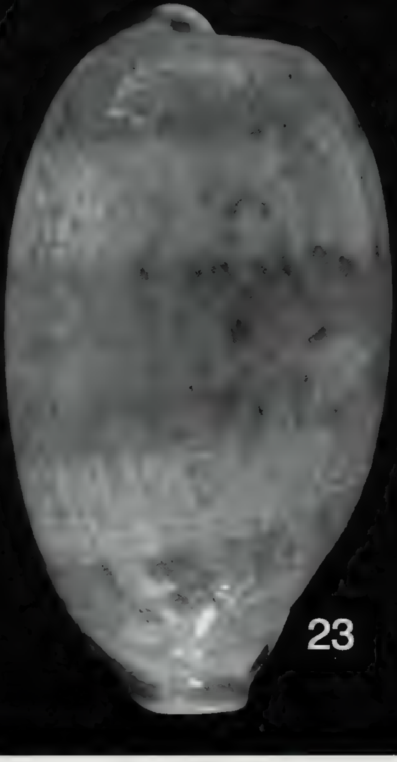
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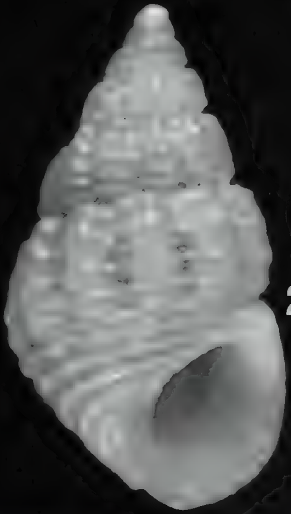
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- *Murchisonella columna* (Hedley, 1907). Nous avons collecté ce minuscule Cimidae (Fig. 18) en 2005 dans une laisse de mer prélevée sur la plage de Karatas (golfe d'Iskenderun - Turquie). Ce mollusque d'origine indo-pacifique est rarement signalé le long des côtes orientales de la Turquie (Mienis, 2004) et son mode d'introduction en cet endroit reste inconnu (Zenetos et al., [2003] 2004).

PERENNITE OU FRAGILITE DE L'INSTALLATION

Si certaines espèces semblent fermement établies de place en place [exemples: *Strombus persicus*, *Brachidontes pharaonis* (P. Fischer, 1870)], d'autres s'installent temporairement, puis disparaissent définitivement ou réapparaissent sporadiquement à d'autres endroits.

- *Anadara demiri* (Piani, 1981). Cet Arcidae indo-pacifique (Fig. 17) a été récolté dans le port d'Izmir (Turquie) duquel il aurait aujourd'hui disparu (Zenetos et al., [2003] 2004) pour réapparaître dans le golfe de Thermaikos, la baie de Thessaloniki (Grèce) (Zenetos, 1994) et de manière plus abondante en Italie, au centre de la mer Adriatique - sud de la région d'Ancona (Morello & Solustri, 2001). Ce bivalve semble bien s'adapter dans des conditions portuaires aux eaux fortement polluées. Spécimens en collection: Izmir 1996 (date de collecte validée).
- *Saccostrea commercialis* (Iredale & Roughley, 1933). Cet Ostreidae d'Australie a été importé dans la lagune de Venise (Chioggia) à des fins de culture (Cesari & Pellizzato, 1985). Depuis 1990, sa présence n'aurait plus été signalée (Zenetos et al., [2003] 2004).

Ces deux exemples démontrent qu'un établissement ferme reste toujours aléatoire et qu'il faut parfois de nombreuses années pour qu'un ancrage définitif réussisse. Il suffit aussi que les conditions environnementales changent pour transformer un succès d'établissement ponctuel en un échec.

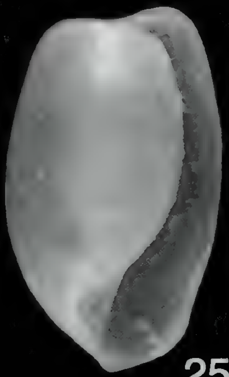
PRESENCES INVASIVES CONTESTEES

La présence de certaines espèces invasives est rejetée par la littérature. Cependant, des spécimens figurent souvent au sein de collections privées. Retenons à titre non exhaustif les exemples suivants:

- *Umbonium vestiarium* (Link, 1807). Ce Trochidae des Philippines a été collecté en Libye en 1969, et mentionné une seule fois dans la littérature (Zenetos et al., [2003] 2004). Mienis (2004) l'exclut de la liste des espèces invasives en Méditerranée. Spécimens en collection: Paphos (Chypre) 1989 - exemplaires vides, localisation validée (Fig. 19). Haïfa (Israël), 1987 et Alexandrie (Egypte), 1999 - exemplaires operculés - acquisitions, sans possibilité de validation certaine.
- *Coralliobia madreporarum* (Sowerby, 1832). La récolte dans les Pouilles (Italie) de 3 spécimens de ce Coralliophilinae indo-pacifique (Fig. 21) a été signalée comme étant exceptionnelle (Oliverio, 1989). Depuis, ce mollusque n'a plus fait l'objet de publications prouvant son établissement définitif en Méditerranée. L'espèce a été récemment exclue de la liste des envahisseurs de la Méditerranée. Spécimens en collection: au large de Ravenna (Italie) - (80 m) - acquisition, sans possibilité de validation certaine.
- *Erronea caurica* Linnaeus, 1758. Bien que également rejeté par Zenetos et al. ([2003] 2004) et Mienis (2004), ce représentant des Cypraeidae est rapporté de Rhodes (Barash et Danin, [1988] 1989), de Chypre (Giannuzzi-Savelli et al., 1997), de El Arish (Egypte - Barberini & Fuschi : communication personnelle) et de Haïfa (acquisition, sans possibilité de validation certaine) (Fig. 23).

Fig 25 - 35

25. *Cylichna cf mongii* (Audouin, 1826) - Ras Rmel (Djerba - Tunisie), 3,3 x 2,1 mm. **26.** *Malvufundus regula* (Forskål, 1775) - Narlikuyu (Turquie), 29,9 x 39,2 mm. **27.** *Brachidontes pharaonis* (Fischer P., 1870) - Karatas (Golfe d'Iskenderun - Turquie), 7,9 x 5,3 mm. **28.** *Spondylus spinosus* Schreibers, 1793 - Yumurtalik (Golfe d'Iskenderun - Turquie), 8,5 x 5,8 mm. **29.** *Gafrarium pectinatum* (Linnaeus, 1758) - Liman Kalesi (Turquie), 27,0 x 19,2 mm. **30.** *Cerithium scabridum* Philippi, 1848 - Akko (Israël), 12,0 x 4,4 mm et 12,6 x 4,9 mm. **31.** *Ergalatax obscura* Houart, 1996 - Yumurtalik (Golfe d'Iskenderun - Turquie), 20,6 x 10,9 mm. **32.** *Diodora ruppellii* (Sowerby G.B. I, 1835) - Yumurtalik (Golfe d'Iskenderun - Turquie), 21,1 x 9,1 mm. **33.** *Purpuradusta gracilis notata* (Gill, 1858) - Gulcihan (Golfe d'Iskenderun - Turquie), 16,3 x 10,2 mm. **34.** *Gibborissoa virgata* (Philippi, 1849) - Liman Kalesi (Turquie), 5,4 x 2,0 mm. **35.** *Diala varia* Adams A., 1861 - Yumurtalik (Golfe d'Iskenderun - Turquie), 2,5 x 1,1 mm.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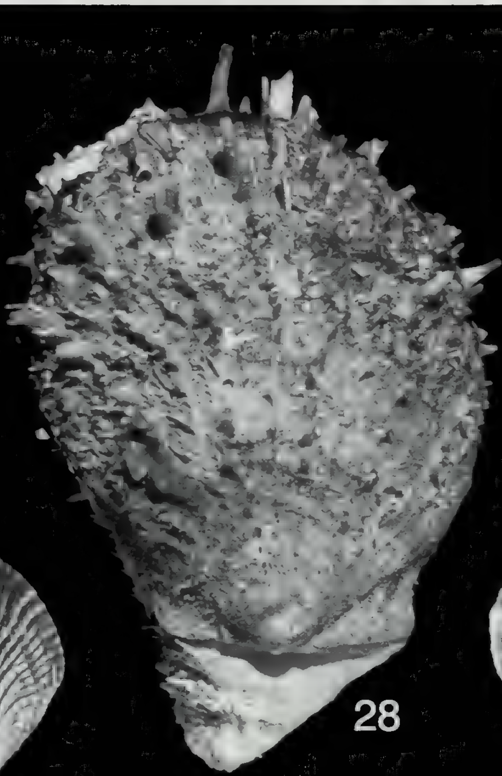
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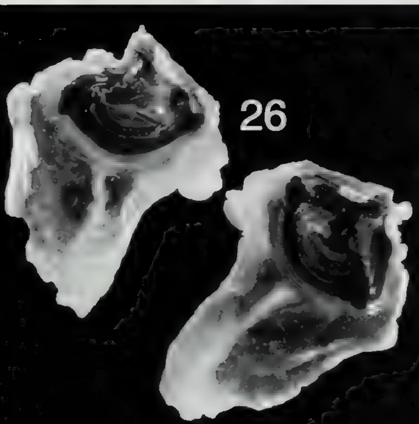
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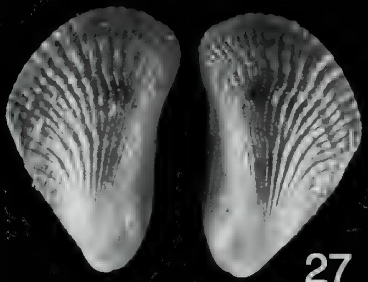
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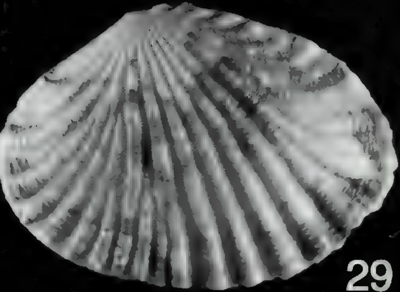
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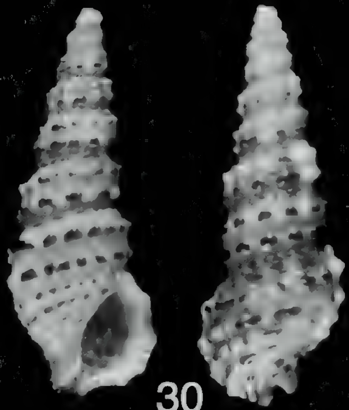
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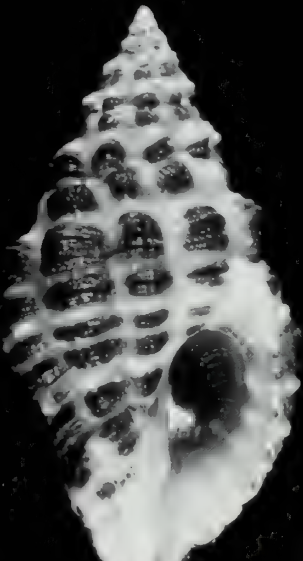
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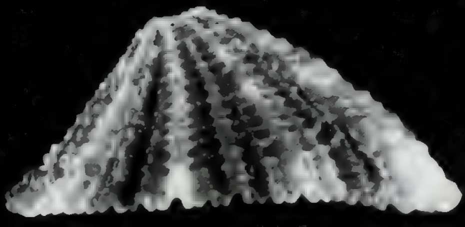
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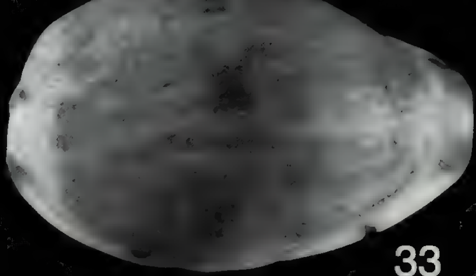
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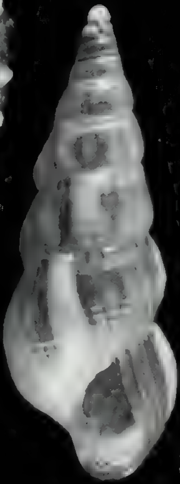
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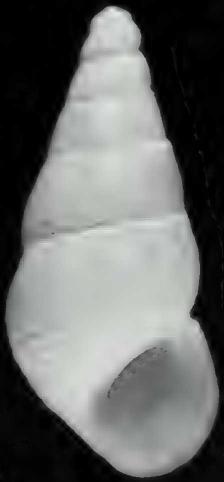
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FAUSSES INTRODUCTIONS

Des rejets anthropiques peuvent donner lieu à de faux rapports d'introduction. Si l'espèce n'est pas trouvée vivante, en plusieurs exemplaires et à plusieurs reprises ou si sa présence est totalement aberrante dans le milieu, il peut s'agir d'un rejet accidentel ou volontaire dû à une quelconque activité humaine.

- Sur la plage de Riccione (Italie), trois espèces indo-pacifiques ont été répertoriées (Tisselli et al., 2005): *Pyramidella dolabrata* (Linnaeus, 1758), *Dentalium octangulatum* Donovan, 1804 et *Pupa* sp.. Il ne s'agit pas d'espèces migrantes. Elles proviennent du sable contenu dans des sachets d'appâts destinés à la pêche à la ligne, importés de Taiwan. Lorsque les vers ont été utilisés, le sable est rejeté sur la plage avec son contenu en petites coquilles exotiques. Tôt ou tard, elles sont retrouvées par un collectionneur s'intéressant au contenu malacologique des laisses de mer locales.

ESPECES DITES INVASIVES MAIS EN FAIT DE SOUCHE MEDITERRANEENNE

Il est des espèces dites invasives qui ne sont plus considérées comme telles.

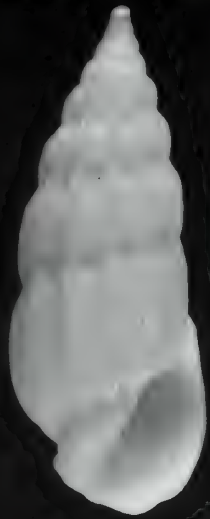
- *Potamides conicus* (de Blainville, 1829). Ce Potamididae ne fait plus partie du groupe des espèces lessepsiennes. La découverte d'un fossile en région méditerranéenne laisse supposer que cette espèce serait native de Méditerranée (Zenetos et al., [2003] 2004). De plus, Hoffman et al. (2006) précisent que l'espèce était présente en mer Rouge et en mer Méditerranée avant l'ouverture du canal de Suez. Elle pourrait avoir été transportée par des oiseaux (Faber, 1999). Spécimens en collection: Marsaxlokk (Malte), Viareggio (Italie), Faliraki (Rhodes), Djerba et Iles Kerkennah (Tunisie), Taşucu (Turquie), Akko (Fig. 22) (Israël).
- *Alvania dorbignyi* (Audouin, 1826) (Fig. 24). Lors de sa première signalisation en Méditerranée, ce Rissoidae a été qualifié d'espèce lessepsienne sur base d'une représentation dans une planche de Savigny datée de 1805. Celle-ci était sensée représenter des mollusques d'Egypte provenant de la mer Rouge. Il a été démontré ultérieurement que certaines des coquilles figurées dans ce document étaient des espèces méditerranéennes. Mienis (1985) a émis l'hypothèse qu'*Alvania dorbignyi* n'existait pas en mer Rouge et qu'il s'agissait d'une espèce endémique de l'est de la Méditerranée. L'absence de collecte récente de ce mollusque en mer Rouge vient à l'appui de cette thèse (Dekker & Orlin, 2000). Zenetos et al. ([2003] 2004) considèrent toujours l'espèce comme lessepsienne ce que continue de réfuter Mienis (2005).
- *Cylichna cf mongii* (Audouin, 1826). Ce Cylichnidae a été présenté comme une espèce lessepsienne (Cecalupo & Quadri, [1995] 1996), mais il semblerait que l'on soit en présence d'une espèce méditerranéenne non décrite à ce jour (Zenetos et al., [2003] 2004). Spécimens en collection: nombreuses localités sur les Iles Kerkennah et à Djerba (Tunisie) (Fig. 25); Side, Taşucu (Turquie).

LA LESSEPSIE

Nous appelons "Lessepsie" (Carte 2) la région comprise entre le canal de Suez, les côtes d'Egypte, de Palestine, d'Israël, du Liban et de la Syrie, le golfe d'Iskenderun, les côtes contiguës de la Turquie ainsi que celles de Chypre. Pourquoi cette appellation toute personnelle? Parce que lorsqu'on porte sur une carte les provenances connues de chacune des espèces de mollusques lessepsiens, ou réputés tels, se dessine une zone de la Méditerranée orientale où les découvertes sont denses et nombreuses. Tenant compte de l'absence de publications récentes concernant des relevés faunistiques sur la côte à l'ouest du delta du Nil (Egypte et Libye), on ne peut infirmer que la colonisation lessepsienne ne se dirige pas également vers l'ouest du canal de Suez. Néanmoins, trois critères importants sont à prendre en compte.

Figures 36 - 43

36. *Rissoina bertholleti* Issel, 1869 - Caesarea (Israël), 7,9 x 3,3 mm. **37.** *Zafra savignyi* (Moazzo, 1939) - Liman Kalesi (Turquie), 4,6 x 1,7 mm. **38.** *Zafra selasphora* (Melvill & Standen, 1901) - Yumurtalik (Golfe d'Iskenderun - Turquie), 3,2 x 1,5 mm. **39.** *Cylichnina girardi* (Audouin, 1826) - Lady's Mile Beach (Chypre), 3,3 x 1,9 mm. **40.** *Chama pacifica* Broderip, 1834 - Akko (Israël), 70,6 x 62,5 mm. **41.** *Dendrostrea frons* (Linnaeus, 1758) - Yumurtalik (Golfe d'Iskenderun - Turquie), 17,0 x 10,0 mm et 19,1 x 16,0 mm. **42.** *Rhinoclavis kochi* (Philippi, 1848) - Akko (Israël), 23,9 x 6,8 mm. **43.** *Pseudominolia nedyma* (Melvill, 1897) - Taşucu (Turquie), 5,4 x 5,2 mm.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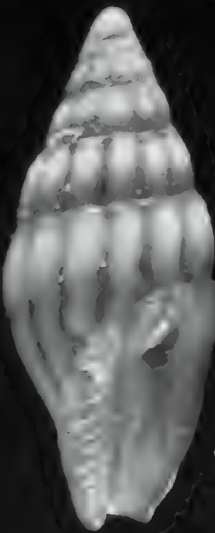
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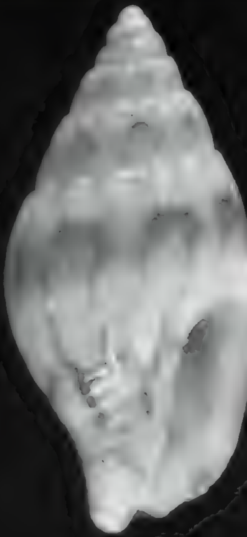
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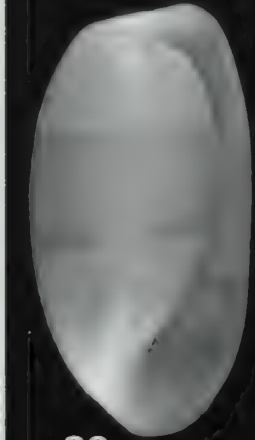
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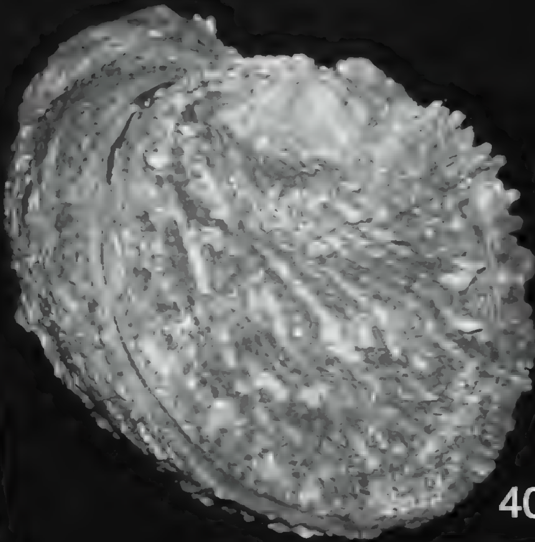
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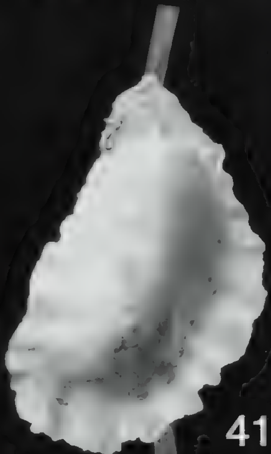
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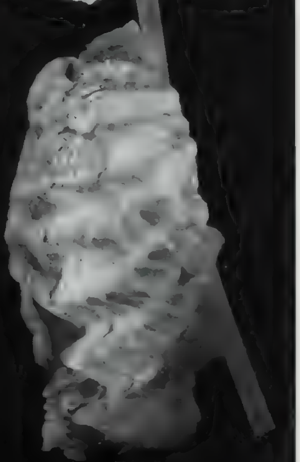

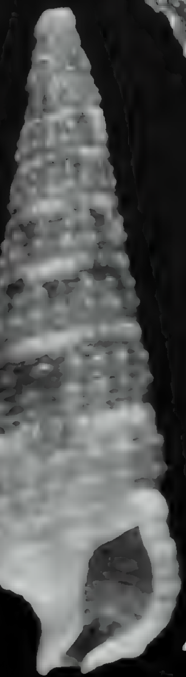
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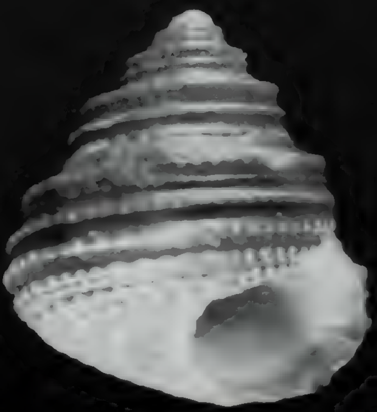
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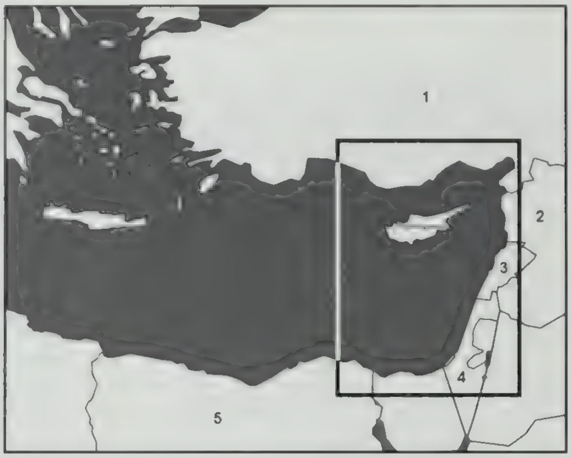

Carte 2. "La Lessepsie"

1. Turquie. - 2. Syrie. - 3. Liban. - 4. Israël et Territoires palestiniens. - 5. Egypte.

- **Le sens de circulation des courants marins côtiers de surface**. Ceux-ci tournent dans le fond de la Méditerranée, dans le sens inverse des aiguilles d'une montre. Ils viennent de la Libye et de l'Egypte, passent au large de Port Saïd, remontent le long des côtes du Moyen-Orient, s'enroulent vers l'ouest dans le golfe d'Iskenderun, et prolongent leur course le long des côtes turques vers les îles grecques de la mer Egée (Hamad et al., 2005). Ceci peut expliquer le flux migratoire quasi unidirectionnel des mollusques lessepsiens du sud-est en ouest.

- **La présence du delta du Nil.** Situé à l'ouest de l'embouchure du canal de Suez, il apporte une quantité importante d'eau douce et d'alluvions en Méditerranée. Ces apports pourraient constituer une barrière écologique naturelle à la propagation vers le sud-ouest des espèces lessepsiennes. Il est à noter que le flux d'eau douce est actuellement moins important que par le passé, le barrage d'Assouan contrôlant à ce jour les crues des eaux du Nil. Seul un inventaire des mollusques marins présents à l'ouest d'Alexandrie et en Libye pourrait nous éclairer sur la validité de ces théories et sur l'étendue géographique de la "Lessepsie".

- **Des conditions écologiques favorables**. Il faut également que les espèces issues du canal de Suez trouvent des conditions écologiques optimales pour s'adapter en Méditerranée, ce qui semble être le cas dans sa partie orientale. On y recense à ce jour la présence de plus d'une centaine d'espèces de mollusques lessepsiens et indo-pacifiques (Mienis, 2004). Les conditions de températures sont fort différentes dans le bassin ouest de la Méditerranée, ce qui pourrait constituer un frein à une expansion rapide et massive des espèces dans cette direction. Les changements climatiques en cours pourraient influencer eux aussi la dispersion présente et future des espèces en modifiant entre autres la température des eaux de surface.

EXPLORATION PARTIELLE DES ESPECES INVASIVES DE MOLLUSQUES DU GOLFE D'ISKENDERUN ET DES ZONES ADJACENTES

Il existe à l'heure actuelle une nouvelle communauté de mollusques dans la Méditerranée orientale, qui est un mélange d'espèces méditerranéennes et invasives, ce que Fishelson (2000) appelle la communauté "Red - Med". La biodiversité reste en faveur des espèces méditerranéennes mais certaines espèces de mer Rouge deviennent dominantes en nombre d'individus et donc réellement invasives (Gofas & Zenetos, 2003).
La côte sud-est de la Turquie (Carte 3), comprise entre Taşucu et la frontière syrienne est particulièrement riche et dense en espèces de mollusques invasifs, lessepsiens ou supposés tels (Çevik & Sarihan, 2004). Certaines espèces présentes en mer Rouge se retrouvent dans le golfe d'Iskenderun mais ne sont pas toutes signalées dans le canal de Suez et / ou le long des côtes levantines. Elles occupent toutes les niches écologiques côtières. Des renseignements concernant les eaux profondes font défaut.
A l'ouest de Mersin, la région de Taşucu se caractérise par une succession de baies peu profondes entrecoupées de quelques plages de sable. Les espèces invasives y sont nombreuses (Buzzuro & Greppi, 1996). Sur les fonds, les rochers alternent avec des zones de sable et des herbiers denses. L'espèce dominante est *Strombus persicus* Swainson, 1821 (Fig. 1) qui a réussi à s'installer, grâce à sa larve planctotrophe, jusqu'aux confins du Péloponnèse et des îles grecques (Zenetos et al., 2005). Sur la frange rocheuse, à fleur d'eau, se côtoient de nombreux *Spondylus spinosus* Schreibers, 1793 et/ou *Spondylus cf. multisetosus* Reeve, 1856, espèces pour lesquelles

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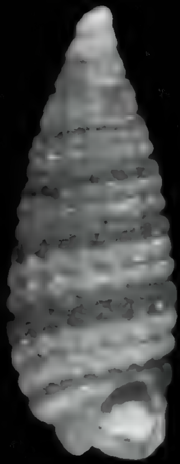
Figures 44 - 51

44. *Cerithiopsis pulvis* (Issel, 1869) - Caesarea (Israël), 3,0 x 1,2 mm. **45.** *Anadara natalensis* (Krauss, 1848) - Iskenderun (Golfe d'Iskenderun - Turquie), 52,1 x 45,3 mm. **46.** *Clathrofenella ferruginea* (Adams A., 1860) - Karatas (Golfe d'Iskenderun - Turquie), 1,7 x 0,7 mm. **47.** *Finella pupoides* Adams A., 1860 - Kizkalesi (Turquie), 2,0 x 0,8 mm. **48.** *Pyrunculus fourierii* (Audouin, 1826) - Taşucu (Turquie), 4,0 x 1,1 mm. **49.** *Monotygma amoena* (Adams, A., 1851) [*Leucotina natalensis* Smith, 1910] - Taşucu (Turquie), 5,9 x 2,8 mm. **50.** *Monotygma fulva* (Adams A., 1851) [*Monotigma lauta* (Adams A., 1853)] - Taşucu (Turquie), 9,4 x 3,1 mm. **51.** *Gastrochaena cymbium* (Spengler, 1783) - Yumurtalik (Golfe d'Iskenderun - Turquie), 7,2 x 2,9 mm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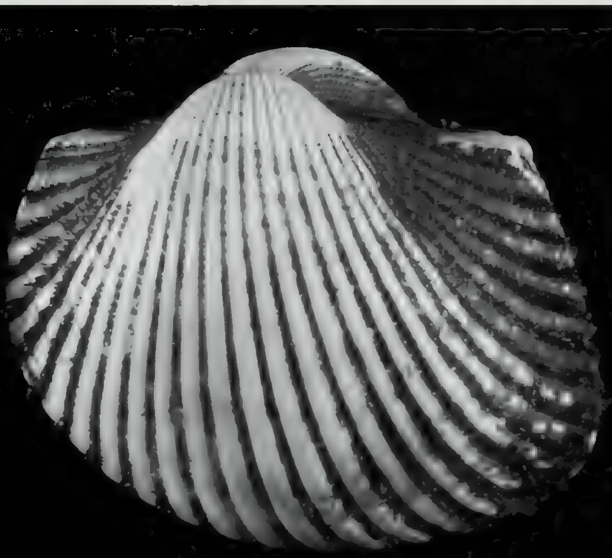
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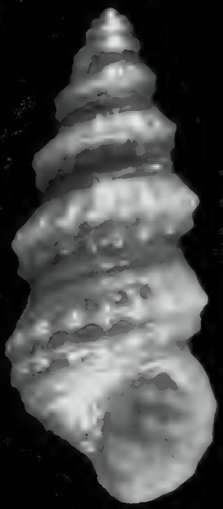
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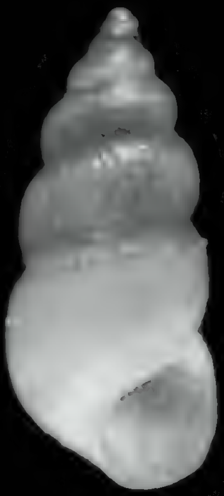
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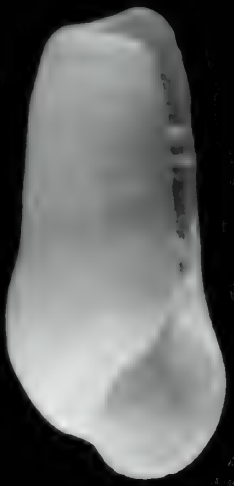
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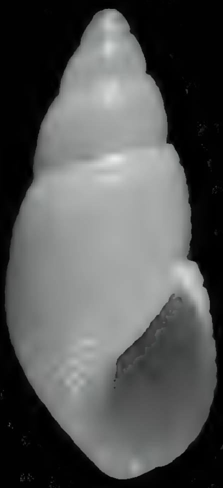
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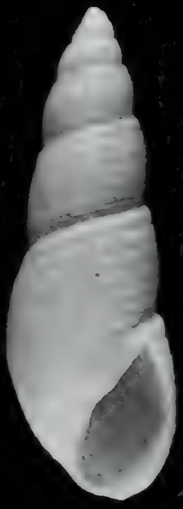
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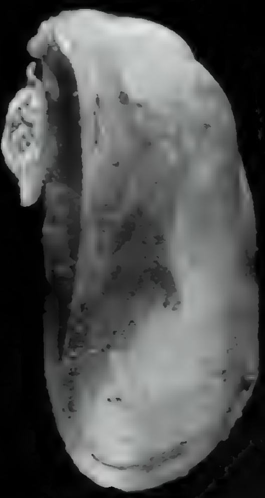
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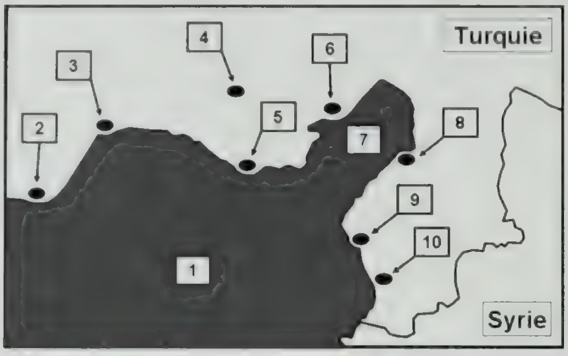
la séparation spécifique est peu évidente (Çeviker, 2001) à moins que les deux espèces n'en forment qu'une (Mienis, 2004) (Fig. 28).



Carte 3. Golfe d'Iskenderun et environs

1. Mer Méditerranée. - 2. Liman Kalesi. - 3. Mersin. - 4. Adana. - 5. Karatas - 6. Yumurtalik. - 7. Golfe d'Iskenderun. - 8. Iskenderun. - 9. Kale. - 10. Samandag.

Les anfractuosités des rochers de la côte sont occupées par d'immenses colonies de *Malvufundus regula* (Forskål, 1775) (Fig. 26) dont les spécimens s'alignent verticalement les uns à coté des autres. Sur les rochers, de nombreux exemplaires de *Brachidontes pharaonis* (Fischer P., 1870) (Fig. 27) sont fermement accrochés par leur byssus. Un mètre cinquante plus bas, le sable alterne avec des blocs rocheux épars de petite taille. Sur le sable gisent des coquilles de bivalves morts parmi lesquelles de nombreux spécimens de *Gafrarium pectinatum* (Linnaeus, 1758) (Fig. 29). A la surface des petits rochers, d'innombrables *Cerithium scabridum* Philippi, 1848 (Fig. 30) broutent la végétation. Sous ces rochers, la vie est intense: *Ergalatax obscura* Houart, 1996 (Fig. 31) est fort abondant. Sur les surfaces rocheuses lisses on trouve des spécimens de *Diodora ruppellii* (Sowerby G.B. I, 1835) (Fig. 32) et de *Purpuradusta gracilis notata* (Gill, 1858) (Fig. 33). Plus loin, mais toujours à faible profondeur, s'étendent de grands herbiers sur les feuilles desquels vivent de petites espèces comme *Smaragdia souverbiana* (Montrouzier, 1863) (Fig. 3), *Gibborissoa virgata* (Philippi, 1849) (Fig. 34), *Diala varia* Adams A., 1861 (Fig. 35), *Rissoina bertholleti* Issel, 1869 (Fig. 36), *Zafra savignyi* (Moazzo, 1939) (Fig. 37), *Zafra selasphora* (Melvill & Standen, 1901) (Fig. 38) ou encore *Cylichnina girardi* (Audouin, 1826) (Fig. 39).

Aux environs du port de Taşucu, les eaux sont plus profondes (3 à 10 mètres). Le fond est parsemé d'immenses blocs rocheux. On y retrouve les spondyles, de taille plus grande (12 à 15 cm) sur lesquels s'attachent fermement de gros spécimens de *Chama pacifica* Broderip, 1834 (Fig. 40) et des spécimens de *Dendrostrea frons* (Linnaeus, 1758) (Fig. 41). Pour cette espèce, on ne dispose d'aucune information concernant sa présence le long des côtes du Moyen-Orient (Çeviker, 2001).

A l'est de Taşucu, s'étend une vaste étendue marécageuse bordée d'une plage de sable fin. Dans les laisses de mer qui s'y déposent, on retrouve de nombreux spécimens vides de *Rhinoclavis kochi* (Philippi, 1848) (Fig. 42) et quelques rares spécimens de *Pseudominolia nedyma* (Melvill, 1897) (Fig. 43) et de *Cerithiopsis pulvis* (Issel, 1869) (Fig. 44).

Au-delà de Mersin, on pénètre dans le golfe d'Iskenderun, bordé à l'ouest par l'embouchure du fleuve Ceyhan dont les bras forment un très large delta. En son milieu se situe le port de pêche de Karatas. De part et d'autre du port s'étendent des kilomètres de plage de sable fin sur lesquelles se récoltent de gros spécimens d'*Anadara natalensis* (Krauss, 1848) (Fig. 45). A certains endroits privilégiés se déposent quelques laisses de mer riches en micro-mollusques: *Clathrofenella ferruginea* (Adams A., 1860) (Fig. 46), *Finella pupoides* Adams A., 1860 (Fig. 47), *Pyrunculus fourierii* (Audouin, 1826) (Fig. 48), *Monotygma amoena* (Adams A., 1851) (Fig. 49) et *Monotygma fulva* (Adams A., 1851) (Fig. 50). Ces deux dernières espèces ont récemment fait l'objet d'une révision (van Aartsen & Hori, 2006) dans laquelle elles sont respectivement reprises sous les noms de: *Leucotina natalensis* Smith, 1910 et *Monotigma lauta* (Adams A., 1853).

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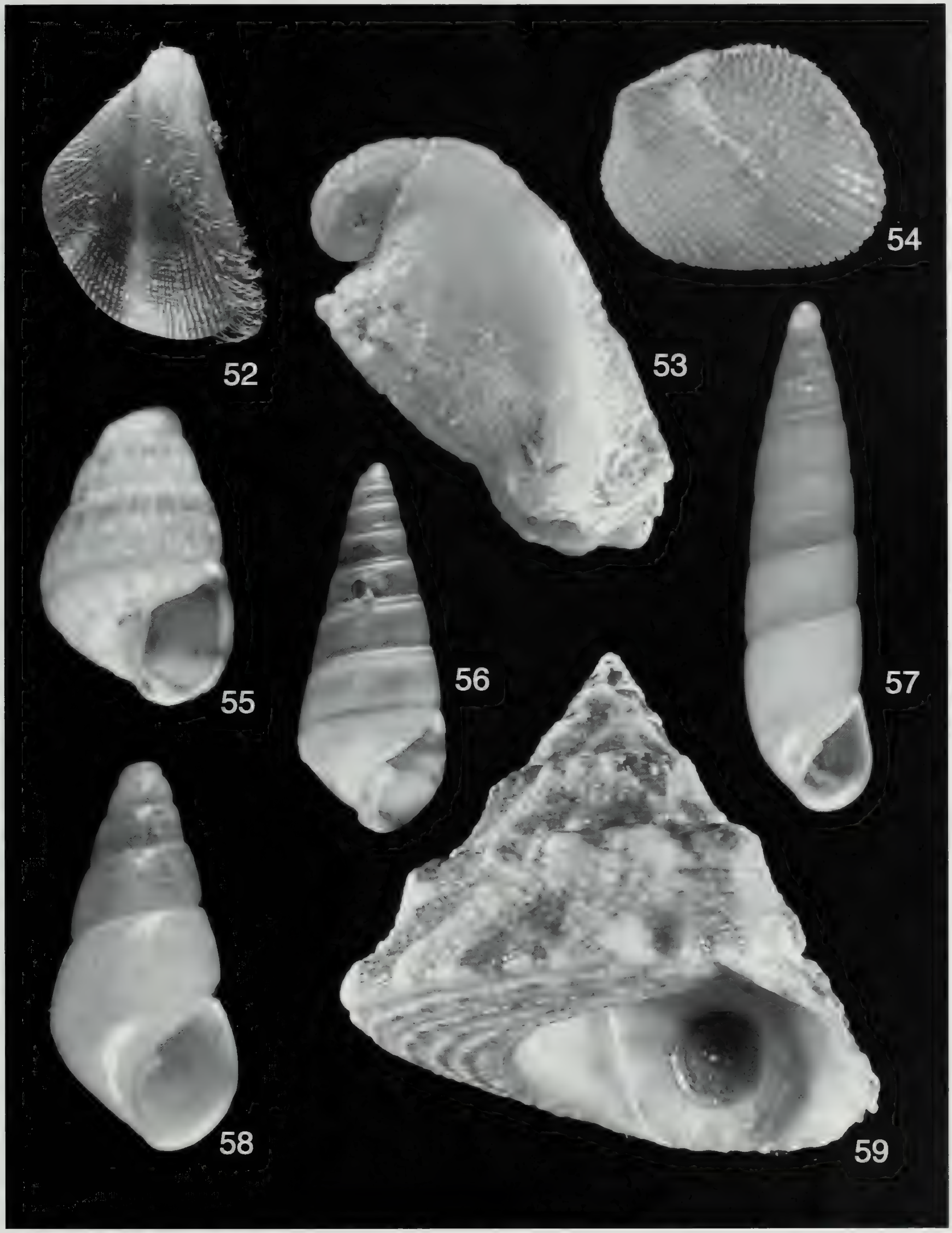
52. *Septifer forskali* Dunker, 1855 - Yumurtalik (Golfe d'Iskenderun - Turquie), 9,7 x 6,9 mm. **53.** *Amathina tricarinata* (Linnaeus, 1767) - Yumurtalik (Golfe d'Iskenderun - Turquie), 7,0 x 3,8 mm. **54.** *Afrocardium richardi* (Audouin, 1826) - Yumurtalik (Golfe d'Iskenderun - Turquie), 5,6 x 4,6 mm. **55.** *Chrysallida fischeri* (Hornung & Mermod, 1925) - Yumurtalik (Golfe d'Iskenderun - Turquie), 1,1 x 0,6 mm. **56.** *Syrnola fasciata* (Jickeli, 1882) - Karatas (Golfe d'Iskenderun - Turquie), 3,9 x 1,5 mm. **57.** *Styloptygma beatrix* Melvill, 1911 [*Syrnola lendix* (Adams A, 1863)] - Yumurtalik (Golfe d'Iskenderun - Turquie), 2,2 x 1,0 mm. **58.** *Odostomia lorioli* (Hornung & Mermod, 1924) - Yumurtalik (Golfe d'Iskenderun - Turquie), 2,5 x 1,1 mm. **59.** *Trochus erythreus* Brocchi, 1821 - Yalikent (Golfe d'Iskenderun - Turquie), 25,4 x 26,9 mm.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A l'Est du Delta de Ceyhan, le port, la plage et les rochers environnants de Yumurtalik sont autant de lieux propices à de fécondes récoltes. Les filets abandonnés sur les quais du port sont riches en *Hexaplex pecchiolianus* (d'Ancona, 1871), Muricidae non-lessepsien endémique du golfe d'Iskenderun (Houart, 2001). Ceux-ci sont colonisés par de nombreux spécimens de *Gastrochaena cymbium* (Spengler, 1783) qui creusent l'épaisseur du test du gastéropode (Delongueville & Scaillet, 2005) (Fig. 51). Les *Spondylus spinosus* également présents dans les filets proviennent de 20 à 30 mètres de fond et sont couverts de concrétions parmi lesquelles de nombreux mollusques lessepsiens (et non-lessepsiens) trouvent refuge. Un examen attentif d'un lot d'une vingtaine de *Spondylus* a révélé la présence de bivalves comme *Brachidontes pharaonis* (Fischer P., 1870), *Septifer forskali* Dunker, 1855 (Fig. 52) (Çeviker, 2002b), *Dendrostrea frons* (Linnaeus, 1758), *Malvufundus regula* (Forskål, 1775), *Chama pacifica* Broderip, 1834, *Afrocardium richardi* (Audouin, 1826) (Fig. 54) (Delongueville & Scaillet, 2006b) et *Gastrochaena cymbium* (Spengler, 1783). Les gastéropodes sont représentés par *Clathrofenella ferruginea* (Adams A., 1860), *Finella pupoides* Adams A., 1860, *Sticteulima lentiginosa* (Adams A., 1861), *Ergalatax obscura* Houart 1996, *Zafra selasphora* (Melvill & Standen 1901), *Amathina tricarinata* (Linnaeus, 1767) (Fig. 53), *Chrysallida fischeri* (Hornung & Mermod, 1925) (Fig. 55) et *Pyrunculus fourierii* (Audouin, 1826). Ce "microcosme lessepsien" cohabitait avec dix espèces de bivalves et huit espèces de gastéropodes de souche méditerranéenne (Delongueville & Scaillet, 2006c).

L'analyse du contenu stomacal des Astropectinidae (échinodermes - astéries) est également un moyen très efficace pour collecter de petites espèces de mollusques benthiques (Delongueville & Scaillet, 2004a). Un spécimen d'*Astropecten irregularis pentacanthus* (Delle Chiage, 1827), prélevé dans le port de Yumurtalik, contenait dans son estomac de nombreux individus de *Finella pupoides* Adams A., 1860, *Syrnola fasciata* (Jickeli, 1882) (Fig. 56), *Odostomia lorioli* (Hornung & Mermod, 1924) (Fig. 58) et *Styloptygma beatrix* Melvill, 1911 (Fig. 57). van Aartsen & Goud (2006), dans leur récente révision, reprennent cette dernière espèce sous le nom de: *Syrnola lendix* (Adams A., 1863). D'autres mollusques d'origine méditerranéenne faisaient également partie du régime alimentaire de cette étoile de mer.

Après avoir dépassé la zone industrielle d'Iskenderun, la côte du golfe reprend un aspect plus naturel formé de longues plages de galets entrecoupées de zones sableuses. A quelques centimètres de profondeur, sous les pierres on retrouve la faune lessepsienne : *Diodora ruppellii* (Sowerby G.B. I, 1835), *Trochus erythreus* Brocchi, 1821 (Fig. 59), *Purpuradusta gracilis notata* (Gill, 1858), *Spondylus spinosus* Schreibers, 1793 et *Chama pacifica* Broderip, 1834.

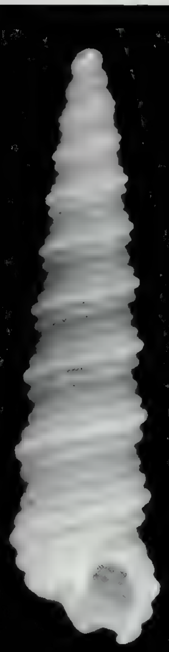
Au-delà d'Arsuz, la route quitte la côte et rend toute recherche malacologique impossible en cet endroit. Une piste pénible traverse la montagne et mène à "Kale", lieu-dit aujourd'hui inaccessible car englobé dans une zone militaire interdite d'accès. La chose est dommage car une exploration antérieure à cet état de fait avait révélé la présence d'une côte rocheuse désertique riche en mollusques invasifs comme en témoigne la collecte de *Metaxia bacillum* (Issel, 1869) (Fig. 60), *Cingulina isseli* (Tryon, 1886) (Fig. 61), *Acteocina mucronata* (Philippi, 1849) (Fig. 62) et *Bulla ampulla* Linnaeus, 1758 (Fig. 63).

Au sud de Samandag, port de pêche important que l'on rejoint par un large détour via l'intérieur des terres (Antakya), on aboutit à la frontière syrienne et au début des côtes englobant le littoral de la Syrie et du Liban. Zibrowius & Bitar (2003) dressent une liste de quelques espèces invasives récoltées au Liban dont *Murex forskoehli* Röding, 1798 (Fig. 64).

Plus au sud, la côte israélienne se caractérise par une succession de plages de sable bordées ou non d'un plateau rocheux. Sur la côte, aux environs de Shefayim, *Cellana rota* (Gmelin, 1791) (Fig. 65), gastéropode patelliforme, est présent en nombre. Il occupe la niche écologique des patelles absentes en cet endroit, observation confirmée par Mienis (2002). Sur le sable, on trouve également des coquilles de *Purpuradusta gracilis notata* (Gill, 1858) (Delongueville & Scaillet, 1989). Une laisse de mer à Shavei Zion contenait quelques exemplaires d'*Alvania dorbignyi* (Audouin, 1826) et de *Chrysallida maiae* (Hornung & Mermod, 1924) (Fig. 66). A Caesarea, une autre laisse de mer renfermait *Cerithiopsis tenthrenois* (Melvill, 1896) (Fig. 68).

Figures 60 - 68

60. *Metaxia bacillum* (Issel, 1869) - Issel (Turquie), 5,7 x 1,2 mm. **61.** *Cingulina isseli* (Tryon, 1886) - Shavei Zion (Israël), 4,5 x 1,3 mm. **62.** *Acteocina mucronata* (Philippi, 1849) - Kale (Golfe d'Iskenderun - Turquie), 4,4 x 2,2 mm. **63.** *Bulla ampulla* Linnaeus, 1758 - Kale (Golfe d'Iskenderun - Turquie), 14,7 x 10,5 mm. **64.** *Murex forskoehli* Röding, 1798 - Raoucheh (Liban), 56,0 x 26,8 mm. **65.** *Cellana rota* (Gmelin, 1791) - Shefayim (Israël), 22,1 x 15,9 mm. **66.** *Chrysallida maiae* (Hornung & Mermod, 1924) - Liman Kalesi (Turquie), 4,1 x 1,6 mm. **67.** *Sabia conica* (Schumacher, 1817) - Alexandrie (Egypte), 7,0 x 13,3 mm. **68.** *Cerithiopsis tenthrenois* (Melvill, 1896) - Caesarea (Israël), 2,7 x 1,0 mm.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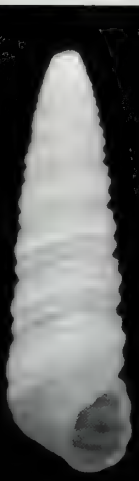
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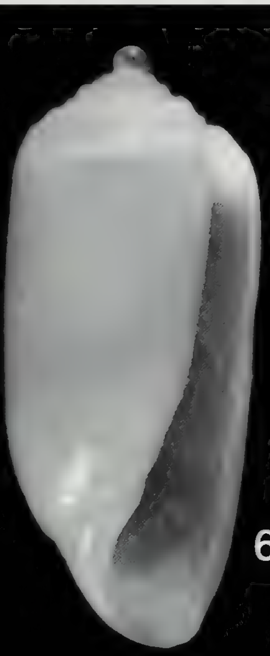
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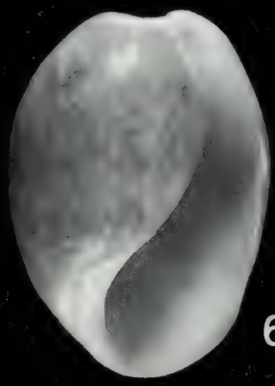
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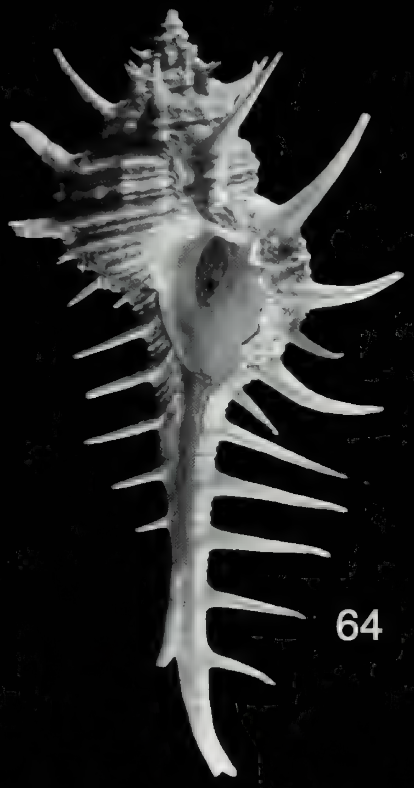
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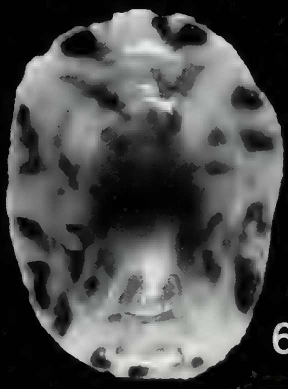
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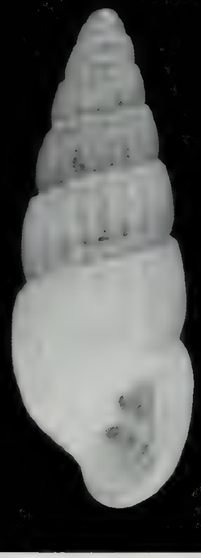
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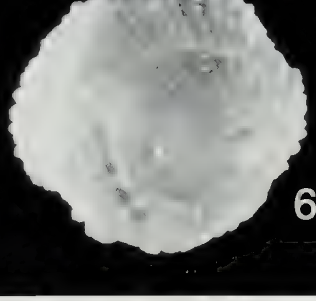
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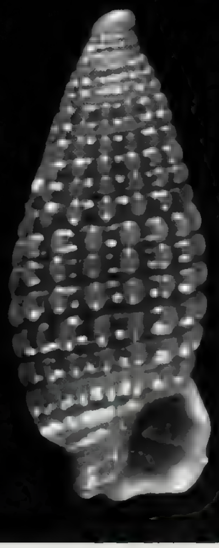
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Des spécimens vivants de *Spondylus spinosus* et quelques exemplaires de *Chama pacifica* peuvent être observés dans les filets sur les quais du port d'Akko (pêcheurs - 10 à 20 mètres). La littérature, elle aussi, témoigne de la richesse des côtes israéliennes en espèces lessepsiennes (Barash & Danin, 1992 - Mienis, 2004).

Les côtes d'Israël se prolongent par celles de Palestine et d'Egypte; elles ont fait l'objet d'un relevé très complet de la faune malacologique (Barash & Danin, 1992). *Sabia conica* (Schumacher, 1817) - Alexandrie (Egypte) - est illustré en Fig. 67.

Au milieu des ces côtes levantines se trouve l'île de Chypre. Quelques articles (Buzzuro & Greppi, 1997 et Cecalupo & Quadri, 1994, [1994] 1995, [1995] 1996) font état de listes de mollusques, notamment allochtones. Il semble que le pourcentage d'espèces invasives par rapport aux espèces méditerranéennes y soit moins élevé que le long des côtes levantines. Récoltes personnelles : *Brachidontes pharaonis* - Paphos, Agia Napa, *Pinctada radiata* - Bath of Aphrodite, *Trochus erythreus* - Paphos, *Umbonium vestiarium* - Paphos, *Cerithiopsis tenthrenois* - Paphos, *Strombus persicus* - Agios Georgios, Agia Napa, Bath of Aphrodite, *Cylichnina girardi* - Lady's Mile Beach.

Les récoltes de *Strombus persicus* à Side (Turquie) en 1985 (Delongueville & Scaillet, 1985) et de *Purpuradusta gracilis notata* sur le sable de Shavei Zion (Israël) en 1987 (Delongueville & Scaillet, 1989) furent à l'origine de notre intérêt pour les espèces invasives de bivalves et de gastéropodes présents en Méditerranée.

CONCLUSIONS

Au départ, le sujet semblait simple à couvrir. La Méditerranée est bien délimitée et ses contacts avec les mers environnantes sont restreints. Un examen plus approfondi du sujet rend compte d'une complexité plus importante, si l'on tient compte des nombreuses voies d'invasion possibles. Comme certains mollusques utilisent simultanément ou successivement plusieurs modes de migration, le suivi de la colonisation n'en devient que plus difficile. Enfin, pour certaines espèces de mollusques les voies d'introduction ne sont pas connues ou sont sujettes à caution.

Le trafic des navires en provenance de l'Atlantique, de la mer Noire ou de la mer Rouge croît régulièrement. Les eaux de ballasts sont les principaux vecteurs du transport et de l'introduction d'espèces étrangères à la Méditerranée. Les implantations ne seront réussies que si les envahisseurs trouvent un milieu favorable dans la zone de libération. On les retrouve initialement dans les ports où les purges de ballasts sont le plus souvent réalisées. Si toutes les conditions favorables d'implantation sont réunies, il n'est pas rare que les espèces essaiment de place en place. L'élargissement et l'approfondissement du canal de Suez ne feront qu'augmenter le trafic maritime.

Les espèces introduites dans le cadre de l'aquaculture semblent être assez agressives en termes d'occupation des niches écologiques méditerranéennes. Cela se comprend aisément dans la mesure où ces espèces sont sélectionnées pour s'adapter le plus facilement possible aux nouvelles conditions locales. Il arrive aussi que ces implantations s'accompagnent de la présence d'espèces opportunistes sans valeur commerciale. Celles-ci ont également des chances de s'adapter et de faire souche dans leur nouveau milieu. Il est utile de suivre ces mouvements de population qui pourraient exercer une influence économique et induire également une pression artificielle sur les divers écosystèmes d'origine. La multiplication de ces zones d'aquaculture est une source croissante d'expansion des espèces étrangères dans l'ensemble de la Méditerranée.

Les espèces qui entrent de manière "naturelle" par la voie du canal de Suez s'installent dans l'est de la Méditerranée là où les conditions écologiques sont les plus comparables à celles de la mer Rouge. Ces espèces lessepsiennes sont extrêmement nombreuses et constituent la "masse" des envahisseurs répertoriés en Méditerranée. L'abondance de littérature publiée sur le sujet en témoigne. Tout le long de la côte levantine, cet afflux d'espèces nouvelles invasives s'observe sans aucune difficulté. Un regard posé sous la surface de l'eau suffit pour convaincre de l'expansion des espèces lessepsiennes dont certaines pourraient prendre définitivement la place d'espèces autochtones. Certains envahisseurs deviennent aujourd'hui déjà dominant dans le paysage côtier sous-marin. L'élargissement prévu du canal de Suez pour 2010 ne fera qu'accentuer ce phénomène migratoire.

Les changements climatiques en cours, qui réchauffent les eaux de surface, risquent d'étendre l'aire de distribution des espèces lessepsiennes vers l'ouest de la Méditerranée. A quelques exceptions près, les espèces atlantiques trouvent moins de facilités pour s'implanter en Méditerranée. La majorité des espèces invasives est donc d'origine indo-pacifique.

Ce tour d'horizon des espèces invasives de Méditerranée est loin d'être complet. Il a été essentiellement réalisé sur base de nos récoltes personnelles et se doit d'être complété par l'ensemble de la littérature existante publiée sur le sujet. Un tel inventaire ne pourra jamais être exhaustif. Les relevés faunistiques réalisés sur des laisses de mer, sur le contenu de dragage où sur d'autres substrats révèlent chaque année l'identification d'espèces invasives nouvelles. De plus, certaines espèces s'installent ou disparaissent à l'occasion d'un changement environnemental de faible ampleur, ou tout simplement parce que leur établissement était encore fragile. Enfin, la colonisation par la voie du canal de Suez est un phénomène dynamique par lequel, à chaque occasion, de nouvelles espèces ont la chance de pouvoir franchir cette voie d'accès à la Méditerranée.

Le suivi des espèces invasives en Méditerranée, plus particulièrement des espèces lessepsiennes, nous permet d'assister à une modification faunistique qui se réalise à échelle temporelle humaine, ce qui rend le phénomène des plus passionnants.

Tableau 1. Liste des espèces invasives en Méditerranée orientale reprises dans ce travail

	GASTEROPODES
Familles	**Espèces**
Nacellidae	*Cellana rota* (Gmelin, 1791)
Fissurellidae	*Diodora ruppellii* (Sowerby G.B. I, 1835)
Neritidae	*Smaragdia souverbiana* (Montrouzier, 1863)
Trochidae	*Pseudominolia nedyma* (Melvill, 1897)
	Trochus erythreus Brocchi, 1821
	Umbonium vestiarium (Link, 1807)
Cerithiidae	*Cerithium scabridum* Philippi, 1848
	Rhinoclavis kochi (Philippi, 1848)
Dialidae	*Diala varia* Adams A., 1861
Litiopidae	*Gibborissoa virgata* (Philippi, 1849)
Scaliolidae	*Clathrofenella ferruginea* (Adams A., 1860)
	Finella pupoides Adams A., 1860
Triphoridae	*Metaxia bacillum* (Issel, 1869)
Cerithiopsidae	*Cerithiopsis pulvis* (Issel, 1869)
	Cerithiopsis tenthrenois (Melvill, 1896)
Eulimidae	*Sticteulima lentiginosa* (Adams A., 1861)
Rissoidae	*Alvania dorbignyi* (Audouin, 1826)
	Rissoina bertholleti Issel, 1869
Strombidae	*Strombus persicus* Swainson, 1821
Hipponicidae	*Sabia conica* (Schumacher, 1817)
Cypraeidae	*Purpuradusta gracilis notata* (Gill, 1858)
Muricidae	*Ergalatax obscura* Houart, 1996
	Murex forskoehli Röding, 1798
	Thais lacera (Born, 1778)
Columbellidae	*Zafra savignyi* (Moazzo, 1939)
	Zafra selasphora (Melvill & Standen, 1901)
Amathinidae	*Amathina tricarinata* (Linnaeus, 1767)
Pyramidellidae	*Cingulina isseli* (Tryon, 1886)
	Chrysallida fischeri (Hornung & Mermod, 1925)
	Chrysallida maiae (Hornung & Mermod, 1924)
	Monotygma amoena (Adams A., 1851) / *Leucotina natalensis* Smith, 1910
	Monotygma fulva (Adams A., 1851) / *Monotigma lauta* (Adams A., 1853)
	Odostomia lorioli (Hornung & Mermod, 1924)
	Styloptygma beatrix Melvill, 1911 / *Syrnola lendix* (Adams A., 1863)
	Syrnola fasciata (Jickeli, 1882)
Cimidae	*Murchisonella columna* (Hedley, 1907)

Retusidae	*Cylichnina girardi* (Audouin, 1826)
	Pyrunculus fourierii (Audouin, 1826)
Bullidae	*Bulla ampulla* Linnaeus, 1758
Cylichnidae	*Acteocina mucronata* (Philippi, 1849)

	BIVALVES
Familles	**Espèces**
Arcidae	*Anadara natalensis* (Krauss, 1848)
Mytilidae	*Brachidontes pharaonis* (Fischer P., 1870)
	Septifer forskali Dunker, 1855
Pteriidae	*Pinctada radiata* (Leach, 1814)
Malleidae	*Malvufundus regula* (Forskål, 1775)
Spondylidae	*Spondylus spinosus* Schreibers, 1793
Ostreidae	*Crassostrea gigas* (Thunberg, 1793)
	Dendrostrea frons (Linnaeus, 1758)
Chamidae	*Chama pacifica* Broderip, 1834
Cardiidae	*Afrocardium richardi* (Audouin, 1826)
Veneridae	*Gafrarium pectinatum* (Linnaeus, 1758)
Gastrochaenidae	*Gastrochaena cymbium* (Spengler, 1783)

NOTE

La nomenclature des mollusques est reprise de CLEMAM, "Check List of European Marine Mollusca" www.somali.asso.fr/clemam/index.clemam.html - consultation 24 juin 2006.
Tous les mollusques illustrés font partie des collections de Christiane Delongueville et de Roland Scaillet, à l'exception de *Murex forskoehli* (Fig. 64) qui fait partie de la collection de Roland Houart.

REMERCIEMENTS

Nos remerciements vont à Doğan Çeviker, spécialiste des mollusques du golfe d'Iskenderun, pour les échanges d'informations et les discussions fructueuses. Nous remercions aussi Roland Houart pour les conseils et la relecture du texte.

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Acrosterigma suduirauti, a new species of the *Acrosterigma uniornatum* species group (Bivalvia: Cardiidae) from the Philippines

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KEYWORDS. Bivalvia, Cardiidae, Philippines, *Acrosterigma suduirauti*, n. sp.

ABSTRACT. *Acrosterigma suduirauti* n. sp. is described from shells originating from the Philippines. It belongs to the species group of *A. uniornatum* Vidal, 1999 and is especially close to *A. profundum* Vidal, 1999, with which it is compared. It differs mainly by the nature of the rib sculpture, the outline, the colouration and the geographic distribution.

INTRODUCTION

In his review of the 'elongated cockles' Vidal (1999) formulated several different species groups with shared characters. One of these is the group of *Acrosterigma uniornatum* Vidal, 1999, including four Recent species and one fossil. The following main characters unite the taxa of this group:

- moderately pointed, ovoid and equilateral shell;
- well marked and delineated, slightly hollowed lunula;
- moderately angled hinge with cardinals slightly connected in the right valve;
- ribs on posterior quarter bearing long thin scales, regularly obliquely placed.

The recent discovery in the Philippines of another extant species confirms the validity of this grouping. Another ecological character of this group is confirmed too: these species live in relatively deep water for Cardiidae, mainly from about 100 m to more than 500 m. They are all characterized and separated from other *Acrosterigma* species by the particular rib morphology of the posterior part of the shell, with ribs bearing regularly disposed parallel straight oblique scales, and by the progressive extension of this ornamentation more or less far into the median-posterior part, lacking any sharp contrast between the posterior slope and the rest of the shell (figs 11-12).

Another observed constant peculiarity is the partial connection of the cardinals in the right valve, a feature never observed in other species groups in *Acrosterigma* or the related *Vasticardium*. The various species of the *A. uniornatum* group can be separated one from another by the number of ribs and the secondary ornamentation of the ribs in the median part of the shell.

Abbreviations

MHNBx: Muséum d'Histoire Naturelle, Bordeaux, France.
MNHN: Muséum national d'Histoire naturelle, Paris, France.
ZMA: Zoological Museum Amsterdam, The Netherlands.
HD: Private collection H. Dekker, Winkel, The Netherlands.
SH: Private collection S. Hobbs, Cape May, U.S.A.
TP: Private collection J.J. ter Poorten, Hilversum, The Netherlands.

MATERIAL AND METHODS

The type series consists of four paired valves; in addition four supplementary paired valves were studied from private collections.

Measurements: H = Height, the longest distance from the umbo to the ventral margin; L = Length, measured parallel to the hinge; W = Width, or maximum thickness of the shell; p.v. = paired valves.

As far as methods of identification are concerned, we must underline the importance of the rib morphology (structure and ornamentation of the ribs).

SYSTEMATICS

Family **CARDIIDAE** Lamarck, 1809
Subfamily **CARDIINAE** Lamarck, 1809
Genus *Acrosterigma* Dall, 1900
Type species: *Cardium dalli* Heilprin, 1887, by original designation

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[1] NOTE: This paper was left incomplete by Jacques Vidal at the time of his death in September 2006. At my request, Mr. J.J. ter Poorten kindly accepted to read and to revise the manuscript as co-author. He completed and improved the text, and all the photographs were taken and added by him.

R. Houart

Acrosterigma suduirauti n. sp.

Figs 1-6; 11; table 1

Type material. Holotype MNHN Moll 9689, Philippines, Panglao Isl., depth 140 m, in sand, dead collected (Figs 1-3); paratype 1 MHNBx 2007.TY.1, same sample as holotype (Fig. 4); paratype 2 ZMA Moll. 4.07.009, Bohol, Balicasag Isl., tangle nets, depth 80–150 m, 10.2006; paratype 3 TP 3220, same sample as paratype 2 (Fig. 6).

Other material examined. Philippines, Bohol, Balicasag Isl., 06.2004. (coll. HD 14267, 1 p.v.); Mindanao, Balut Isl., by tangle nets, deep sea. (coll. SH, 2 p.v., fig. 5); Talikud Isl. 06°56'N-125°41'E, near Davao, with tangle nets, collected by fishermen, 01/02.2006 (coll. TP 3009, 1 p.v.).

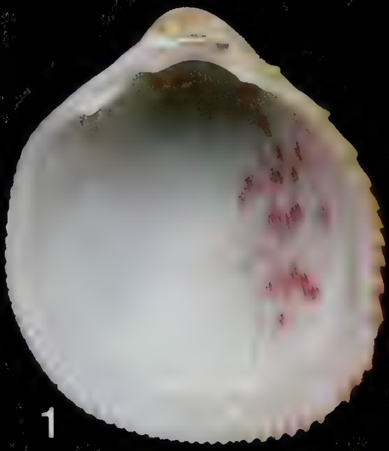
Description. Shell of medium size (holotype H 37.8 mm: largest specimen observed), relatively thin-shelled, slightly elongated (mean L/H = 0.835, range 0.80-0.86, n = 8); appreciably tumid (mean W/L = 0.814, 0.80-0.84, n = 8); rather quadrate, with a straightening of the posterior and anterior margin, both occasionally even slightly concave (paratype 2).
Lunula small, white, identical on both valves, almost flat, except for slight raising of the margins besides umbo.
Colouration: externally whitish or yellowish with irregular red-brownish stains, predominantly on median-posterior part, disappearing in adult marginal zones; posterior slope remaining entirely pinkish brown or orange yellow. Internally, pink stains homologous of exterior ones, gradually diminishing towards margins.
Hinge appreciably asymmetrical with anterior laterals more distant from cardinals than posterior laterals. Cardinal teeth the right valve joined at their base.
Mean rib number: 60.75, range 55-65, n = 8.
Rib morphology: posterior slope with about 10 ribs, flat, divided into two parts: posterior half ornamented with regularly disposed small oblique scales; anterior half smooth. Interstices very thin. In addition, ribs divided by longitudinal furrow situated below scales. In the median-posterior quarter ribs become progressively more raised, with an asymmetrical trapezoidal profile with three parts: a higher posterior flank with same scales as on posterior slope; a smooth flat top zone slightly sloping onwards; a very short anterior flank generally smooth but occasionally, by places, with irregular very oblique diffuse long scales, present too on the posterior slope, but more tubercular. Top furrow observed on most posterior ribs remains present, separating posterior flank from top zone; this furrow progressively disappears onwards. On anterior half of shell ribs become more rounded and scales change progressively into commarginal ridges encroaching upon whole surface of ribs.

Range and habitat. Only known from the Philippines. Collected at depths between 80-150 m.

Remarks. *Acrosterigma suduirauti* mainly differs by the different rib number (55-65) from the other extant members of its species group viz. *A. uniornatum* Vidal, 1999 (36-43 ribs); *A. suluanum* Vidal, 1999 (40-45 ribs); *A. amirante* Vidal, 1999 (52-55 ribs) and *A. profundum* Vidal, 1999 (55-63 ribs, Figs 7-10, 12). The latter is clearly its closest congener. *A. suduirauti* can be differentiated from this species by a more quadrate shape, a thinner, slightly less elongated shell and by the very poor development of the secondary serrations on the anterior flank of the ribs (Fig. 11), while on *A. profundum* (Fig. 12) they are numerous, constant and nearly as well developed as those on the posterior rib flanks. Besides, it has a different distribution and known so far only from the Philippines, whereas *A. profundum* is known from New Caledonia, Marshall Islands (both Vidal, 1999) and Indonesia, Flores Sea (coll. TP 2923, Fig. 9-10). Finally, within the restrictions of the limited material of both species available, *A. suduirauti* appears to have more yellow elements in its colouration, in some cases limited to the posterior margin, sometimes covering the whole shell (Fig. 5). The red-brownish stains do not extend to the anterior margin, which does occur on *A. profundum* (Fig. 9).

Figures 1-11

1-6, 11. *Acrosterigma suduirauti* n. sp. **1-3**. Philippines, Panglao Isl., 140 m, H 37.8 mm, holotype, MNHN Moll 9689. **4.** Philippines, Panglao Isl., 140 m, H 37.0 mm, paratype 1, MHNBx 2007.TY.1, **5.** Mindanao, Balut Isl., by tangle nets, deep sea, H 33.0 mm, coll. SH. **6.** Bohol, Balicasag Isl., tangle nets, 80–150 m, 10.2006, H 34.8 mm, paratype 3, coll. TP 3220, **11.** Detail of median part of right valve, paratype 1.
7-10, 12. *Acrosterigma profundum* Vidal, 1999. **7-8.** New Caledonia, 20°16'S-163°52'E, 245-268 m, H 36.7 mm, holotype MMHN Moll 9788, **9-10.** Indonesia, 06°10'690"S-122°41'489"E, 3–45 m, leg. H. Morrison, 20.10.2005, H 21.6 mm, coll. TP 2923. **12.** Detail of median part of right valve, holotype.



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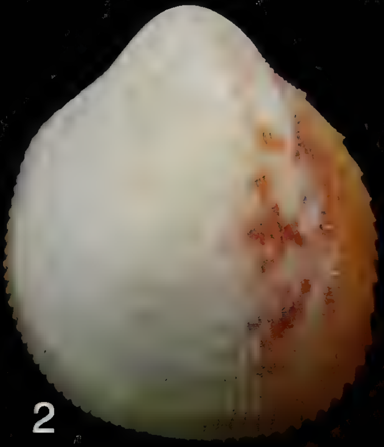

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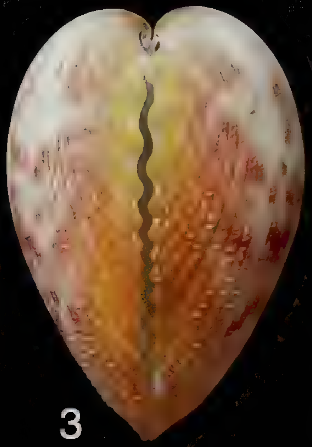

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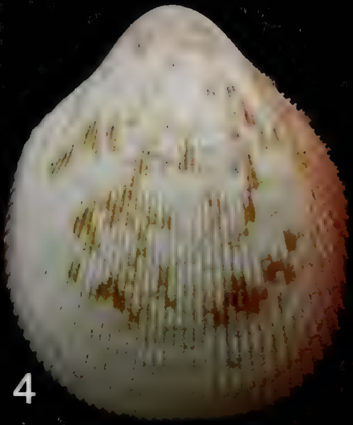

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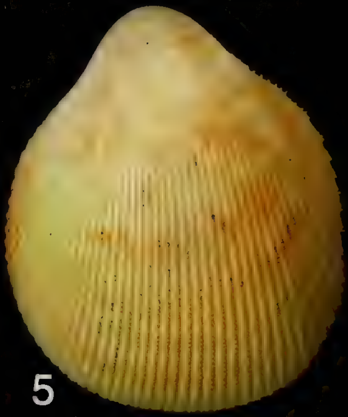

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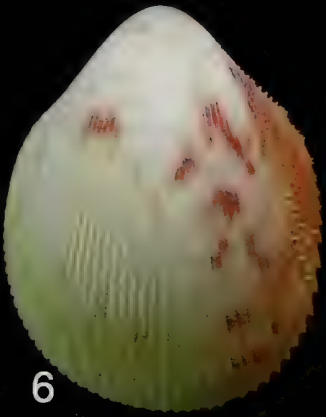

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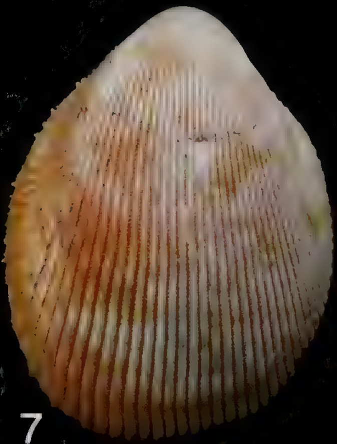

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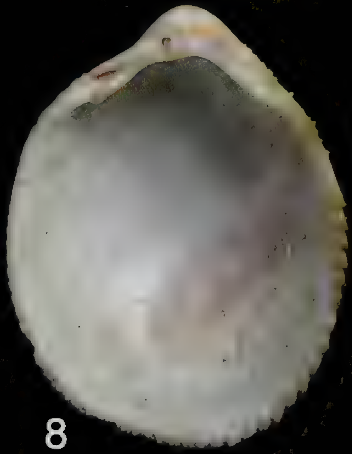

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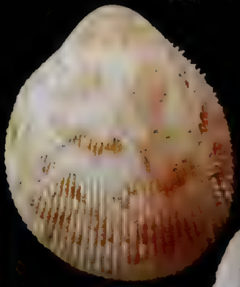

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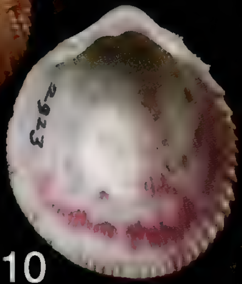

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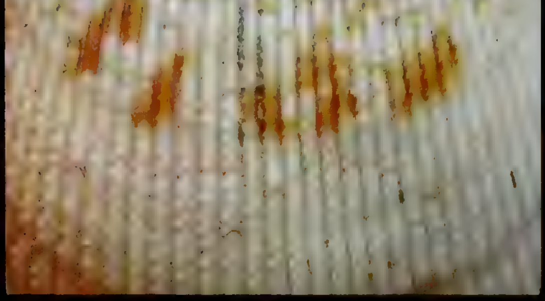

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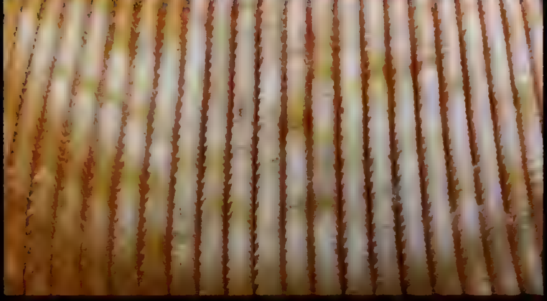

12

Etymology. *Acrosterigma suduirauti* is named after Mr Guillot de Suduiraut, Philippines, who sampled the holotype and paratype 1 and kindly donated this material to science.

ACKNOWLEDGEMENTS

Thanks are due to Mrs. V. Héros, MNHN, Paris, France and Mr. H. Dekker, Winkel, The Netherlands for the loan of material and to Mrs. S. Hobbs, Cape May, U.S.A. for her friendship, hospitality and access to her collection.

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***Acrosterigma suduirauti* n.sp.**	***H***	***L***	***W***	***L/H***	***W/L***	***Ribs***
Holotype MNHN 9689	37.8	32.6	26.1	0.86	0.80	63
Paratype 1 MHNBx 2007.TY.1	37.0	31.5	25.4	0.85	0.81	60
Paratype 2 ZMA 4.07.009	35.1	28.3	23.5	0.81	0.83	64
Paratype 3 TP 3220	34.8	28.0	23.5	0.80	0.84	60
Coll. TP 3009	36.2	30.5	24.6	0.84	0.81	65
Coll. HD 14267	34.4	28.4	23.3	0.83	0.82	59
Coll. SH / 1	33.0	27.7	22.2	0.84	0.80	55
Coll. SH / 2	33.9	28.9	23.1	0.85	0.80	60
Mean values				***0.835***	***0.814***	***60.75***

Table 1. Measurements and rib count of *Acrosterigma suduirauti* n. sp. Sizes in mm.

Scaphella (Scaphella) garciai n.sp. (Gastropoda: Volutidae: Scaphellinae) a new volute from off Yucatan, Mexico

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KEYWORDS. Gastropoda, *Scaphella*, Volutidae, new species, Yucatan, Mexico.

ABSTRACT. *Scaphella (Scaphella) garciai* n. sp. is described on the basis of two specimens, one collected off San Augustine, Florida. Differences between the new species and its congeners are established.

INTRODUCTION

Recently checking his collection, Emilio Fabián García pointed out to me a specimen of the genus *Scaphella* which seemed to be a previously undescribed species. The specimen was given to him by Edith Mugridge, a well-known dealer and shell collector from Sanibel Island, Florida. Ms. Mugridge obtained many of her specimens from a number of shrimpers who worked the east coast of Florida and the Yucatan waters, and the true locality of the specimen in question became uncertain.

Taxonomic placement (in Bail & Shelton, 2001)

The genus *Scaphella* comprises several related polytypic taxa, which have been the subject of controversial classification at both the generic and specific ranks.

Based upon the shape of the radula, Pilsbry & Olsson (1953) split *Scaphella* into three genera:

-*Scaphella* s.s. with but a single long narrow cusp;

-*Clenchina* with a conic central cusp, flanked by two minute accessory cusps (synonym *Rehderia* Clench, 1946);

-*Aurinia* H. & A. Adams, 1853 with a pointed central cusp and two well-developed side cusps.

Weaver & du Pont (1970) and Bayer (1971) downgraded those three genera to a subgeneric rank of *Scaphella*, pointing out the minor taxonomic significance of their radular difference, especially between *Clenchina* and *Scaphella* s.s., both of which are now considered synonyms.

Though relegated into synonymy of *Scaphella* by Emerson & Old, jr. (1979) and Poppe & Goto (1992), the subgenus *Aurinia* deserves to keep its subspecific status: a chief feature, emphasized by Pilsbry & Olsson, is the thin callus covering the ventral side of the shell, often incrusting a muddy deposit. Additional characters such as a complete tricuspidate radula, light structure of the shell, lack of fasciole, obsolete columellar plaits, and open pattern of irregularly spaced dots are sufficient to maintain the polytypic *Scaphella dubia* (Broderip, 1827) in its subgeneric status.

On the contrary, *Scaphella* s.s. includes species with a strong shell, a more or less pronounced fasciole, 2 to 4 well-defined columellar plaits, mostly a dense spiral pattern of dots or bands, and a Y-shaped radula with or without vestigial side cups.

Based upon these shell characters only, *Scaphella garciai* can be temporarily placed into *Scaphella* s.s., pending additional anatomical information.

SYSTEMATICS

Family **VOLUTIDAE** Rafinesque, 1815
Subfamily **SCAPHELLINAE** H. and A. Adams, 1858
Genus ***Scaphella*** Swainson, 1832
Subgenus: ***Scaphella*** *s.s.*
Type species: *Voluta juniona* Lamarck, 1804, by subsequent designation (Herrmannsen, 1848: 423)

Scaphella (Scaphella) garciai n. sp.
Figs 1-5, 12-14

Type locality. Unknown

Range. Until now only collected from northeastern Florida, USA (paratype).

Type material. Holotype ANSP 416213, length: 47.2 mm, width: 15.9 mm mm. locality unknown (Figs 1-3). Paratype: K. & L. Sunderland collection, length 46.0 mm, width: 15.2 mm, taken in fish trap from 300 meters depth off St Augustine, Florida (Figs 4-5).

Description. Shell small, up to at least 47.2 mm in length, elongate fusiform with strong structure and polished surface. Protoconch dome-shaped, large, of 4.3 mm in diameter on holotype, with one smooth, flattened whorl without visible calcarella. Transition protoconch/teleoconch sharp, marked by slightly concave depression (Fig. 12). Teleoconch of three and a half moderately convex, narrow whorls. Surface

entirely sculptured with numerous thin spiral cords (*ca.* 30-35 on penultimate whorl) crossed by light growth striae, giving faint reticulated appearance, weakening on dorsum of last whorl (Fig. 14). Suture adpressed, underlined by subsutural constriction forming well-marked concave ramp. Aperture narrow, elongated, occupying 0.60 % of total shell length. Outer lip thin, rapidly thickening below. Columella straight, with three thin plicae; adapical plica strongest (Fig.13). Siphonal canal narrow, tapered. Fasciole ill-defined. Shell coloration yellowish-ivory without pattern.
Animal and radula unknown.

Comparison. In overall shell characters, the most similar species to *Scaphella garciai* is *Scaphella (Scaphella) gouldiana* (Dall, 1889), which has the same nuclear structure and same spiral threads. However, *S. gouldiana* has a broader ovate shell with a short spire bearing 21-24 solid nodules; its protoconch is slighty more elevated, the spiral sculpture on the body whorl is weaker, and the subsutural band is flat and hardly distinguishable. Two equal plicae plus an abapical smaller and the presence of a pattern of spiral brown bands in *S. gouldiana* precludes also any confusion (Figs 8-9).
A still undescribed small-sized *Scaphella* from deep water off Key West, close to *S. gouldiana* shares with *S. garciai* the same protoconch shape and, on the body whorl, the same spiral sculpture and lack of pattern. However, its smaller size (average length under 40 mm), strongly angled whorls, short triangular spire bearing a spiral row of prominent axial nodules extending onto the first two-third of the body whorl, and four, strongly developed columellar plaits are quite different (Dickson, 1996) (Figs 10-11).
Scaphella neptunia (Clench & Aguayo, 1946) is a small species with a somewhat similar outline, but it differs by having a larger protoconch bearing a prominent calcarella, a shorter spire with one less whorl, a body whorl with strong spiral grooves and a pattern of spiral rows of brownish axial dashes (Figs 6-7).

Etymology. This species is named for Emilio Fabián García, the well-known conchologist who first drew attention to this taxon, and who has donated the holotype to the Academy of Natural Sciences of Philadelphia (ANSP).

Remarks. The first occurence of this taxon in literature has been pictured by K. & L. Sunderland (1992) but misidentified as *Scaphella aguayoi* (Clench, 1940). This shell, selected as paratype, was dredged from 260 meters by Ted Yocius off St. Augustine, FL in 1971. The holotype was labelled off Contoy Light, Yucatan, 200 m deep. However, after later investigations, no fishermen operating in the Yucatan waters have ever seen this shell. This location seems erroneous all the more that the overall characters of *S. garciai* are closer to Florida *Scaphella* than to the known Yucatan species (*S. contoyensis* Emerson & Old, Jr, 1979 and *S. macginnorum* Garcia & Emerson,1987).

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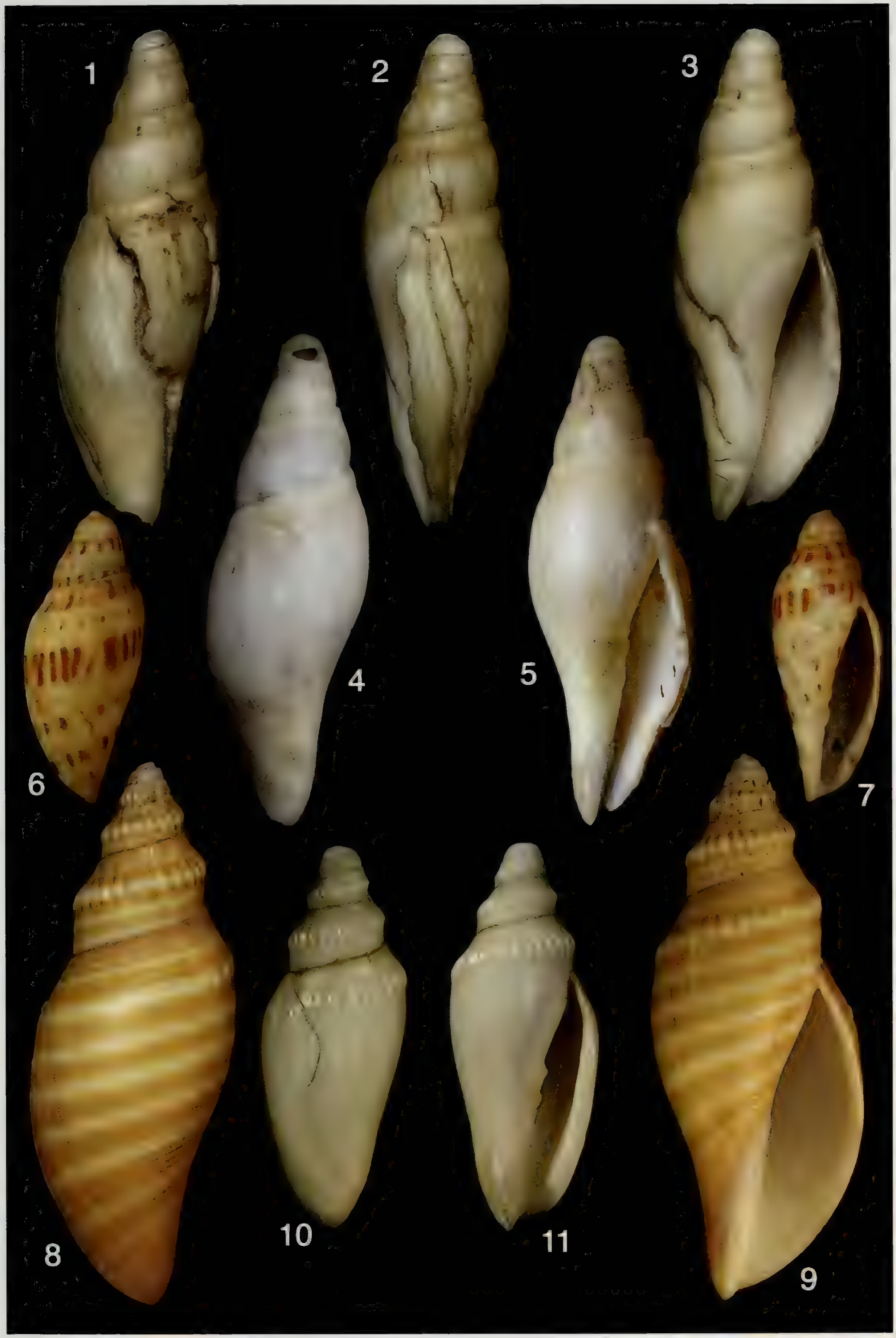
Figures 1-11

1-5. *Scaphella* (*Scaphella*) *garcia* n.sp.
1-3. Holotype, locality unknown, 47.2 x 15.9 mm; **4-5.** Paratype, off St Augustine, Florida, USA, 300 m, 46.0 x 15.9 mm.
6-7. *Scaphella* (*Scaphella*) *neptunia*, 750-800 m, Pedro Bank, southeastern Jamaica. 39.8 x 16.0 mm;
8-9. *Scaphella* (*Scaphella*) *gouldiana*, 500-600m, off Key West, Florida, USA. 60.0 x 24.1 mm;
10-11. *Scaphella* (*Scaphella*) sp., 500-600 m, off Palm Beach, Florida, USA. 38.6 x 15.1 mm;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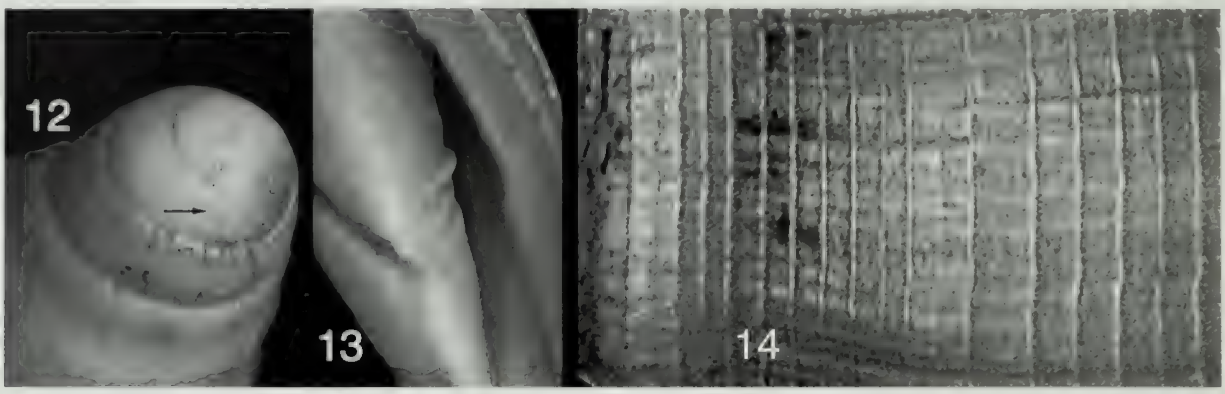

Figures 12-14

12-14. *Scaphella* (*Scaphella*) *garcia* n.sp. **12.** Protoconch. Black arrow on the transition protoconch / teleoconch; **13.** Columellar plaits; **14.** Surface sculpture.

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es articles décrivant de nouvelles espèces (sous-espèces) ne seront acceptés que si le matériel type primaire est déposé dans un Musée u une Institution scientifique publique.

es auteurs devront suivre strictement les règles du *Code de Nomenclature Zoologique* (quatrième édition).

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Mayr, E. 1989. Attaching names to objects. In: *What the philosophy of biology is : essays for David Hull* (M. Ruse, ed.), Klumer Academic, Dordrecht: 235-243.

lustrations. Les photographies doivent être de bonne qualité (couleur ou noir/blanc), imprimées sur papier brillant et montées sur un upport adéquat dans le format final souhaité (max. 16 X 21 cm). Des photographies en couleur peuvent être soumises pour une eproduction en noir et blanc. Les illustrations peuvent également être fournies sur un support informatique (CD-ROM, ZIP) en format MP, JPG ou TIFF avec mention du programme utilisé. Elle doivent être montées et ne peuvent contenir aucun texte, sauf la umérotation. Une version imprimée des planches doit être impérativement jointe au manuscrit.

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raitement des manuscrits. Les manuscrits seront soumis au conseil d'administration qui distinguera les articles d'intérêt scientifique et eux d'intérêt général. Les décisions et les commentaires seront communiqués aux auteurs, qui en tiendront compte. La version corrigée evra être renvoyée à la Société Belge de Malacologie sous forme informatisée (en Word pour Windows) accompagnée d'un tirage sur apier. Elle devra respecter strictement les instructions de mise en page qui auront été communiquées aux auteurs. Une épreuve finale era renvoyée aux auteurs pour correction.

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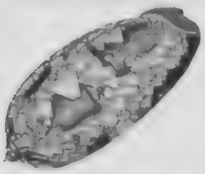


Prochaines activités de la SBM

Claude VILVENS

Lieu de réunion : Médiathèque de l'Institut St Joseph - Rue Félix Hap 14 - 1040 Bruxelles
à partir de 14h. *Sonnez et l'on vous ouvrira !*

ATTENTION ! *Nos activités peuvent nous emmener dans diverses salles (particulièrement pour des projections ou des montages audio-visuels). Il ne nous est donc plus possible d'ouvrir les portes à distance après 15H.*

SAMEDI 23 JUIN 2007

Rolf Haubrichs: La pourpre

Ce chimiste suisse nous propose donc d'étudier en profondeur cette substance qui a suscité tant d'intérêt depuis la nuit des temps en tant que colorant. Bon voyage dans l'histoire et la science !

***

SAMEDI 8 SEPTEMBRE 2007

Claude Vilvens : La phylogénie actuelle des Mollusques

Les dernières découvertes portant sur l'analyse d'ADN ont amené les biologistes à revoir profondément la classification du vivant durant ces dernières années. L'approche cladistique prend à présent en compte ces nouvelles informations et conduit à des phylogénies fort éclairantes. Notre Vice-président se propose ici de nous brosser un tableau général de la situation et, bien sûr, de s'intéresser de plus près aux branches de l'Arbre de la Vie qui concerne les Mollusques : du Cambrien aux temps actuels, voici bien des créatures à rencontrer !

La tradition sera aussi respectée, puisque la première réunion après les grandes vacances est celle de l'événement gastronomique de septembre. Pour entamer la rentrée dans la bonne humeur et nous raconter nos folles aventures de vacances (notamment celles du Président ou du Vice-président – un must !), nous vous proposons en effet de nous retrouver au traditionnel

banquet annuel de la SBM

qui débutera à 19h (voir annonce page 67 pour les détails).

***

SAMEDI 29 SEPTEMBRE 2007

Tout le monde : L'excursion d'automne de la SBM.

L'été se termine, mais pas l'envie d'aller sur le terrain … Comme d'habitude, le choix de la zone que nous prospecterons n'est pas encore fixé – notre équipe de reconnaissance (= Claude et Etienne pour cette fois) va déterminer l'endroit après les grandes chaleurs. Nous lorgnons du côté de la France, mais chut …

Comme d'habitude aussi, le plus simple pour obtenir les dernières informations est de consulter notre site Internet (http://users.swing.be/sw216502/ ou http://www.sbm.be.tf) ou encore de contacter quelques jours auparavant soit Claude (vilvens.claude@skynet.be ou 04/248.32.25), soit Roland (roland.houart@skynet.be ou 016/78.86.16). Comme d'habitude, il convient de prévoir d'emporter sa bonne humeur, un guide de détermination … et sans doute aussi bottes et vêtements de pluie (en principe, il fera magnifique, mais bon ;-) …).

***

SAMEDI 13 OCTOBRE 2007

Marc Alexandre: L'héliciculture

Après de nombreuses visites dans plusieurs parcs d'élevages et fort de son expérience personnelle, Marc a décidé de vous emmener à la découverte de curieuses fermes où le bétail se compte par milliers et dort sous des tuiles ou des planches. Allons ensemble découvrir l'"héliciculture" c'est-à-dire l'élevage d'escargots.

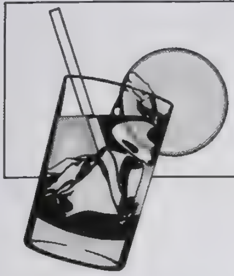
***

SAMEDI 10 NOVEMBRE 2007

Christiane Delongueville et Roland Scaillet: Incursion au Groenland

Deux régions seulement sont accessibles le long des 2.600 km de côtes de l'est du Groenland. L'une d'elles, Ammassalik (Tasiilaq), se situe à la hauteur de l'Islande, on la rejoint par avion au départ de Reykjavik. Un aperçu géographique, culturel et malacologique des environs sera illustré.

Réservez déjà dans vos agendas les 15 décembre 2007.

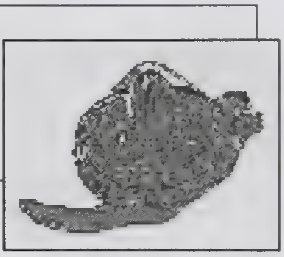


Banquet de la Société Belge de Malacologie

le samedi 8 septembre 2007 à 19h

au restaurant :

Le Rustique

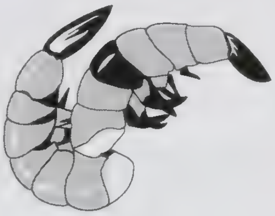


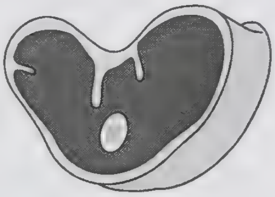
Avenue du Cimetière de Bruxelles, 155
1140 Evere

Comme d'habitude, les menus détaillés ne nous sont pas encore connus, étant donné qu'ils changent chaque mois. Cependant, le menu comprendra dans sa globalité :

- l'apéro et ½ bouteille de vin (blanc ou rouge);
- une entrée parmi 3 propositions;
- un plat principal parmi 3 propositions;
- dessert + café.

Extra à payer individuellement en supplément.





Prix : 37,00 €

Il est impératif de réserver afin que le restaurateur puisse nous réserver le meilleur accueil

Comment réserver ?

Pour le 27 août 2007, au plus tard, il convient de virer la somme correspondant au nombre de menus réservés au compte BBL : **310-1142433 – 53** de
Madame **Annie Langleit**, avenue Cicéron, 27/92 à 1140 – Bruxelles,
(pas de paiement à la SBM, s'il vous plaît !)

Nous nous réjouissons de vous rencontrer lors de cette joyeuse réunion !

Bonnes vacances à tous !!!

Pour les informations de dernière minute :

http://users.swing.be/sw216502/ ou http://www.sbm.be.tf

Tous les articles généraux sont les bienvenus pour Novapex/Société ☺ !

Afin de faciliter le travail de la Rédaction, il est vivement (et le mot est faible ;-)) souhaité de respecter les règles suivantes pour les articles proposés :

- document MS-Word (pour PC Windows 2000 ou XP);
- police de caractères Times New Roman;
- texte de taille 10, titres de taille 12;
- interligne simple;
- toutes les marges à 2,5 cm;
- photos en version électronique JPG.

Merci !

Le rédac'chef ;-)

Mollusques associés à un échantillon de bois immergé au sud-ouest de l'Islande

Christiane DELONGUEVILLE[1] et Roland SCAILLET[2]
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[2] Avenue Franz Guillaume, 63 – B - 1140 Bruxelles / scaillet.roland@skynet.be

MOTS CLEFS. Mollusques, bois immergé, Islande.

KEY WORDS. Molluscs, submersed wood, Iceland.

RESUME. Sur un échantillon de bois immergé, trouvé à Njardvik (port du sud-ouest de l'Islande), trois espèces de mollusques ont été récoltées: *Coccopigya spinigera* (Jeffreys, 1883), *Idas argentea* Jeffreys, 1876 et *Idas sp.*

ABSTRACT. On a sample of submersed wood, found at Njardvik (harbour of South-West Iceland), three species of molluscs have been collected: *Coccopigya spinigera* (Jeffreys, 1883), *Idas argentea* Jeffreys, 1876 and *Idas sp.*

INTRODUCTION

Un certain nombre de mollusques utilisent comme support des substrats organiques immergés. Il peut s'agir, entre autres, de bois coulés dérivants, d'os de différents cétacés et de poissons ou même de fruits. Souvent, les bois sont perforés par des bivalves de la famille des Teredinidae ou de celle des Xylophagidae.

Ainsi, de petits gastéropodes du groupe des Archeogastropoda ont été isolés sur des substrats organiques immergés (Dantart & Luque, 1994). Ils appartiennent, entre autres, aux familles des Cocculinidae [*Coccopygya lata* Warén, 1996, *C. spinigera* (Jeffreys, 1883), *C. viminensis* (Rocchini, 1990)] et des Pseudococculinidae [*Copulabyssia corrugata* (Jeffrey, 1883)].

Des Mytilidae ont également été récoltés sur différents substrats organiques et actuellement cinq espèces d'*Idas* sont répertoriées pour l'Europe (Warén 1991 et 1993): *I. argentea* Jeffreys, 1876, *I. ghisottii* Warén & Carrozza, 1990, *I. modiolaeformis* (Sturany, 1896), *I. pelagica* (= *dalmasi*) (Forbes in Woodward, 1854) et *I. simpsoni* (Marshall, 1900).

RECOLTES PERSONNELLES

Une pièce de bois immergé a été récoltée à Njardvik, port du sud-ouest de l'Islande, le 30 juillet 2006 (Fig. 1). Elle avait été fraîchement pêchée et était déposée sur le quai du port. Ce morceau de bois creusé par des tarets mesurait environ 1 mètre de long pour un diamètre de quelques 30 centimètres. Malheureusement, aucune information précise n'a pu être obtenue concernant le lieu de prélèvement (localisation exacte et profondeur). Cependant, en tenant compte du type de bateaux relâchant à Njardvik en cette époque de l'année, tout porte à croire qu'il s'agirait d'une collecte réalisée fort probablement au sud-ouest de l'Islande.

De petits gastéropodes de la famille des Cocculinidae (L: 5,6 mm x l: 3,9 mm x h: 2,9 mm pour le plus grand d'entre eux), encore remplis de parties molles, collaient à la surface du substrat. Il s'agissait de spécimens de *Coccopigya spinigera* (Jeffreys, 1883) (Fig. 3 et 5) dont le périostracum, garni çà et là de longues soies, était bien conservé. D'autres spécimens vides étaient emprisonnés dans le sédiment remplissant quelques unes des galeries de tarets encore garnies de leur tube de calcaire blanc (Fig. 2). Au total, quelques 36 individus ont été récoltés. L'espèce est particulièrement bien illustrée par Warén (1991) et Dantart & Luque (1994). Distribution: nord-ouest de l'Atlantique (Virginie), Islande, entre les îles Féroé et les Hébrides et Méditerranée occidentale.

Il fut également possible d'identifier la présence d'une autre espèce de mollusques. Plus de trente spécimens d'un petit bivalve de la famille des Mytilidae étaient attachés à la surface des galeries creusées dans le bois. Il s'agissait de *Idas argentea* Jeffreys, 1876 (Fig. 4). Le plus grand des individus mesurait 9,7 mm de long, les autres ne dépassaient guère la longueur de 6 à 7 mm. L'espèce est illustrée par Warén (1991). Distribution: nord-ouest de l'Atlantique (Virginie et Massachusetts), sud de l'Islande et au large du Portugal.

Un autre bivalve de la même famille, beaucoup plus grand que les précédents (+/- 20 mm s'il avait été entier), *Idas sp.* probablement *I. simpsoni* (Marshall, 1900) (Fig. 6) avait pour sa part été écrasé lors de la manipulation de la pièce de bois. Ce spécimen était le seul de son espèce présent sur le bois immergé. Illustrations de *I. simpsoni* dans Warén & Carrozza (1990) et dans Warén (1991). Distribution: sud de l'Islande, Mer du Nord jusqu'à la Méditerranée.

Quant aux tarets (Teredinidae) responsables de la grande fragilisation de la pièce de bois, il n'a pas été possible d'en identifier la ou les espèces, faute d'avoir pu en extraire le moindre spécimen.

CONCLUSION

Un examen attentif de tout substrat organique ayant séjourné au fond des eaux marines permet de récolter de petits mollusques inféodés à ce type de support. La collecte faite à Njardvik de *Coccopigya spinigera*, et d'*Idas argentea* est conforme aux aires de distribution relevées dans la littérature.

NOTE

La nomenclature des mollusques est reprise de CLEMAM, « Check List of European Marine Mollusca » www.somali.asso.fr/clemam/index.clemam.html (consultation: 15 avril 2007).

REMERCIEMENTS

Nous remercions Anders Warén pour les échanges d'informations concernant le genre *Idas* en Europe.

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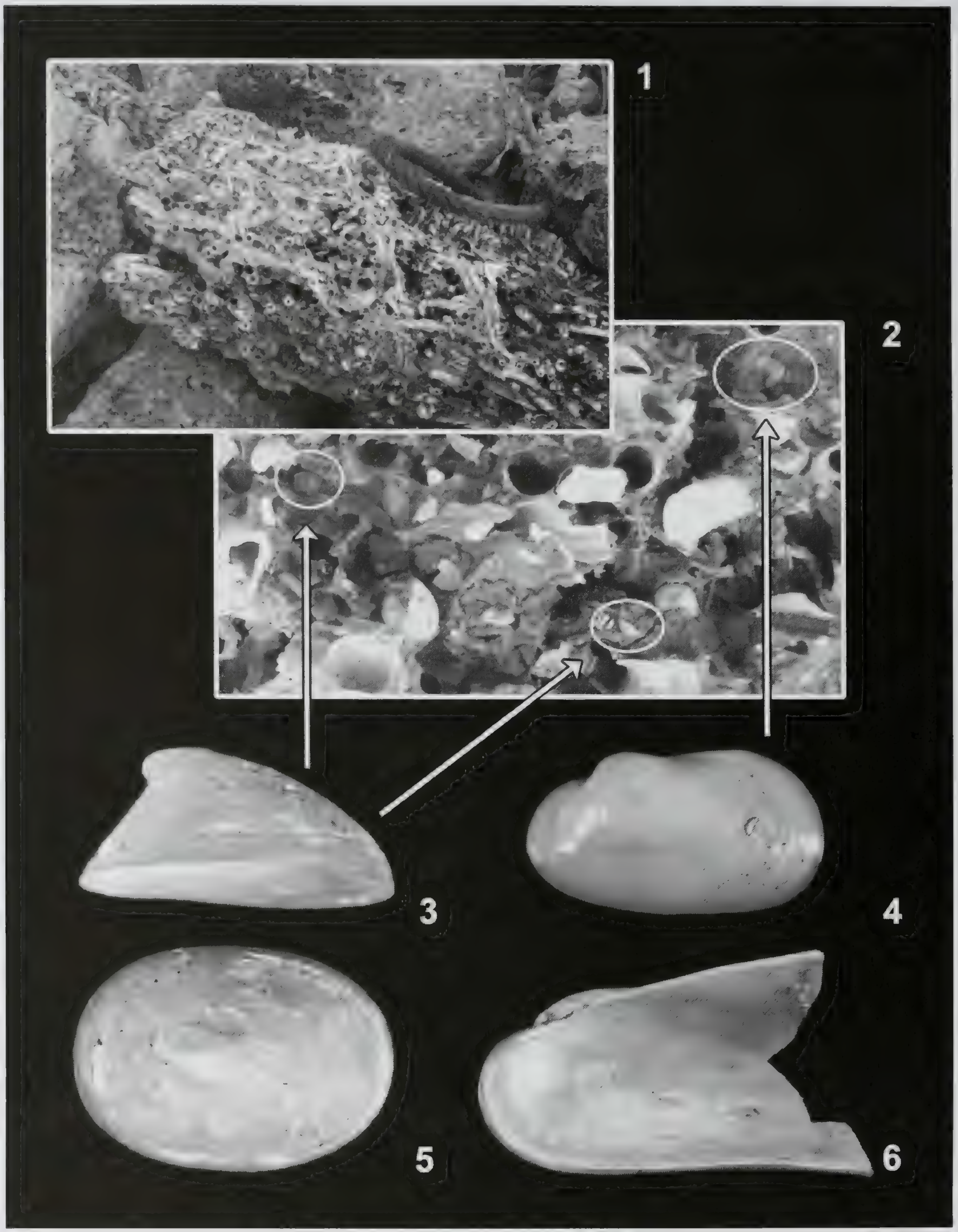
Warén, A. 1991. New and Little Known Mollusca from Iceland and Scandinavia. *Sarsia*, 76: 53-124.

Warén, A. 1993. New and Little Known Mollusca from Iceland and Scandinavia. Part 2. *Sarsia*, 78: 159-201.

LEGENDES

Figure 1:	Pièce de bois immergé (Njardvik - Islande)	+/- 100 x 30 cm
Figure 2:	*Coccopigya spinigera* (Jeffreys, 1883) in situ *Idas argentea* Jeffreys, 1876 in situ	- -
Figure 3:	*Coccopigya spinigera* (Jeffreys, 1883)	5,6 x 3,9 x 2,9 mm
Figure 4:	*Idas argentea* Jeffreys, 1876	8,7 x 5,0 mm
Figure 5:	*Coccopigya spinigera* (Jeffreys, 1883)	5,6 x 3,9 x 2,9 mm
Figure 6:	*Idas sp.*	Fragment de 12,7 mm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L'Assemblée Générale de la Société Belge de Malacologie du 10 février 2007

Roland HOUART, Claude VILVENS, Etienne MEULEMAN et Annie LANGLEIT.

Conformément aux statuts de la Société Belge de Malacologie, nous nous sommes réunis le 10 février 2007 lors de notre assemblée générale pour jeter un regard critique vers nos réalisations passées et vers nos prévisions pour 2007 et vers 2008 pour les cotisations. Les points suivants ont été discutés lors de cette assemblée :

1. RAPPORT MORAL, avec un compte-rendu de nos réunions, de nos excursions, de nos publications, des membres, du conseil d'administration, du site Web, de la bibliothèque et de notre journée anniversaire du 25 novembre.
2. RAPPORT FINANCIER.
3. ELECTIONS
4. COTISATIONS 2008.
5. DIVERS.

L'exposé était soutenu par une présentation Powerpoint retraçant les aventures de Rolanlysse, personnage mythique au destin épique protégé par Athéclauda ;-) …

1. RAPPORT MORAL

1.1 Nos réunions

En 2006 Nous nous sommes retrouvés 9 fois pour suivre des conférences; une fois lors de notre journée anniversaire et 2 fois au cours d'excursions.

- Le **14 janvier 2006** nous présentions la 20me exposition de coquillages réalisée par les membres de la SBM. Ces expos sont fidèlement relatées et illustrées dans Novapex/Société.

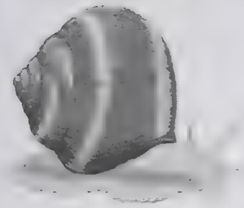
- L'Assemblée Générale **du 4 février** nous a permis de faire le point sur ce qui avait bien ou moins bien fonctionné en 2005. Un verre symbolisant les 40 ans de la SBM avait été offert à tous les membres présents.
- Le **18 février**, David Monsecour nous présentait la famille des Angariidae.
- Le **25 mars**, Etienne Meuleman nous fit rêver en nous promenant sur les côtes de la Floride.
- Quelques semaines plus tard, le **22 avril**, Jacques et Rita Senders nous emmenaient à Bali et Lombok.
- Le samedi **17 juin** Marcel Verhaeghe nous a fait partager quelques-uns de ces moments privilégiés de son dernier périple: Tokyo, Hong-Kong et Australie.
- Le **9 septembre** nous avons organisé une réunion collégiale ou chacun pouvait présenter des coquilles qui en rappelaient d'autres.
- Le samedi **14 octobre** nous organisions Fata Conchylia. Jeu qui consistait à reproduire fidèlement et en grandeur nature un tableau du 18me siècle. Le compte-rendu de cette réunion est paru dans Novapex-Société Vol. 7 (4).
-le samedi **25 novembre** nous vit tous réunis à l'IRSNB pour fêter dignement nos 40 années d'existence (voir plus loin).
- Nos réunions de 2006 se terminèrent le **16 décembre,** lorsque Sophie Valtat nous proposa un panorama général des mollusques pélagiques.

Comme je n'ai pas changé d'avis, je vais devoir me répéter : ces réunions sont une occasion de rencontres, mais elles nous offrent également l'opportunité d'échanger des idées, des nouvelles, des impressions, et de s'offrir, en plus, le ou les coquillages recherchés! En outre, que ce soient les réunions consacrées aux relations de voyages ou à l'étude d'un groupe, d'une famille, ou encore à la présentation d'un autre sujet, les conférenciers sont tous passionnants et nous permettent de parfaire nos connaissances dans différents domaines. De plus, l'ambiance y est excellente: derniers potins, commentaires sur les dernières trouvailles ou acquisitions récentes... découvertes de nouvelles coquilles pour sa collection... échanges... achats... identification... présentation des acquisitions récentes pour la bibliothèque... tout y passe... tout se voit... tout se raconte...

Si vous assistez à nos réunions, continuez à nous rendre visite, si vous n'êtes jamais venus, de grâce, essayez avant de dire que de toute façon c'est trop compliqué, que rouler dans Bruxelles n'est pas une sinécure, que la langue utilisée est un obstacle, que nous sommes trop savants...

Nous parlons (presque) tous français, néerlandais et anglais sans trop de problèmes, rouler dans Bruxelles le samedi n'est vraiment pas trop compliqué (quoique pour l'instant des travaux nous obligent à effectuer un détour), et si vous êtes débutants, dites-vous bien que tout le monde est parti de là et que l'ambiance qui règne ici apaisera très vite vos craintes. Alors venez nous rendre visite !

1.2 Nos excursions



Les excursions de la SBM sont nos "travaux pratiques" sur le terrain. Elles permettent d'évaluer ponctuellement la biodiversité (terme à la mode !) de nos Mollusques Terrestres et Dulcicoles autochtones. Cette année, nous avons parcouru des sites de la province de Liège, que Claude et Etienne connaissent particulièrement bien. Deux excursions se sont déroulées en 2006 :

1) L'excursion de printemps du **27 mai 2006** nous a fait parcourir deux sites de **Basse Meuse**, plus particulièrement de la région de Visé :

- ♦ Le thier de Caster, sur la commune de Petit-Lanaye; cette colline boisée s'est révélée très intéressante du point de vue malacologique, avec des rochers humides et des troncs d'arbres appréciés des Mollusques.
- ♦ Le Cannerbos, colline boisée située aux Pays-Bas, près de la commune belge de Kanne, qui possède autour de son château Neercanne un bois aménagé sur le Cannerberg; cette fois, il a fallu se montrer patient pour trouver des Terrestres, mais nous y sommes parvenus; en particulier, nous avons découvert une petite maison forestière couverte d'Helix pomatia !

2) L'excursion d'automne a eu lieu le **30 septembre** 2006 dans la région de la **Vallée de l'Ourthe**, plus précisément à Chanxhe, Comblain-au-Pont et Tilff; Cette région est bien connue pour ses paysages escarpés et s'est révélée très intéressante pour les malacologues amateurs de Terrestres : plus d'une vingtaine d'espèces furent récoltées au cours de la journée.

1.3 Nos publications : Novapex

Quatre numéros, dont un numéro HORS SERIE et un double ont vu le jour. Comme les autres années les auteurs furent variés et les articles très intéressants. Jugez-en par vous-mêmes:
Le Volume 7 de Novapex a totalisé 116 pages pour les numéros ordinaires et 31 pages pour le numéro Hors Série, soit un total général de 147 pages. Le numéro Hors série de NOVAPEX était consacré à la description de 11 nouvelles espèces de Cystiscidae du Pacifique, par Andrew Wakefield et Tony McCleery. Les numéros ordinaires ont rassemblés 16 articles des auteurs suivants: Philippe Maestrati, Luis Riccardo Lopes de Simone, Adolpho Birman, Mitsuo Chino, Emilio Rolan, Franck Boyer, Christiane Delongueville, Roland Scaillet, Koen Fraussen, Emilio Rolan, Roland Hadorn, Juan Trigo, Constantine Mifsud, Paul Sammut et vos serviteurs, Roland Houart et Claude Vilvens. Les familles abordées étaient variées comme d'habitude : Calliostomatidae, Trochidae, Conidae, Muricidae, Columbellidae, Mytilidae, Buccinidae, Chilodontidae, Turritellidae, Marginellidae et Cystiscidae se sont partagés les 147 pages. Pas moins de 46 espèces nouvelles ont été décrites. Ces articles ont également comportés un total de 11 planches photos en couleur et de nombreuses planches noir et blanc.

1.4 Nos publications : Novapex/Societe

Sur un total de **175 pages** (170 l'année dernière) dans 4 fascicules, le magazine généraliste de la SBM nous a proposé :

a) les **rubriques habituelles** mais tellement importantes: "Prochaines activités", "Quoi de neuf ?", "Quelques nouvelles publications", "Nous avons reçu", "Morceaux choisis" et "L'écho des réunions". Pour ces derniers, particulièrement intéressant en ce sens que tout le monde contribue :
- ♦ EW ➔ R. Houart : Les Muricopsinae
- ♦ AL & RH ➔ C. Delongueville et R. Scaillet : L'Islande.
- ♦ MA ➔ Sophie Valtat : La Malaisie
- ♦ EM ➔ David Monsecour : Le genre *Angaria*.
- ♦ CV ➔ Etienne Meuleman : La Floride, paradis malacologique.
- ♦ RH ➔ Jacques et Rita Senders : septembre/octobre 2005 - Bali et Lombok.
- ♦ SV ➔ Marcel Verhaeghe : Dépaysement australasien

b) les **articles originaux** suivants :
- ♦ C. Delongueville &R. Scaillet : Mollusques associés à Spondylus spinosus Schreibers, 1793 dans le golfe d'Iskenderun (Turquie)
- ♦ C. Delongueville & R. Scaillet : Diodora demartiniorum Buzzurro & Russo, 2004 : extension de la distribution en Méditerranée orientale
- ♦ C. Vilvens : Quelques mollusques terrestres d'Auvergne et du Quercy

et bien sûr
- ♦ C. Delongueville & R. Scaillet : Les marées de 2007

c) les **compte-rendus d'excurion**

- C. Vilvens : L'excursion de printemps de la S.B.M. en Basse-Meuse (27 mai 2006)
- E. Meuleman : L'excursion d'automne de la S.B.M. dans la région de Tilff - Comblain-au-Pont (30 septembre 2006)

d) les **compte rendu de l'AG et de l'exposition de 2005**

- L'Assemblée Générale de la Société Belge de Malacologie du 29 janvier 2005 : R. Houart, A. Langleit, E. Meuleman & C. Vilvens
- L'exposition de 2006 : Claude Vilvens avec les contributions écrites de Christiane Delongueville, Ralph Duchamps, Roland Houart, Annie Langleit, Jeannine Et René Masson, Etienne Meuleman, Roland Scaillet, Jacques Et Rita Senders, Et Edgar Waiengnier - *photographies* : Roland Houart, Etienne Meuleman et Jacques Senders

e) un cas particulier : **le compte-rendu de Fata Conchylia** (14 octobre 2006) : défi relevé ! par Claude Vilvens avec les photos de Roalnd Houart et Eteinne Meuleman.

On peut donc constater que Novapex/Société 2006 a encore une fois été l'œuvre de beaucoup de monde. Un grand merci à tous ! Mais inutile de dire que tous les articles à sujet malacologique sont les bienvenus ☺ !

1.5 Conseil d'administration

Que voulez-vous que j'ajoute à ce que je dis les autres années au sujet du conseil d'administration ? Sinon que, comme tous les ans, je voudrais encore une fois remercier ces travailleurs de l'ombre pour leurs prestations sur des sujets parfois peu attrayants et assez rébarbatifs, bien que nécessaires!

Cette année fut également une année chargée pour nous à cause de notre 40me anniversaire! D'autre part, nous ne pouvions quand même pas laisser passer cet anniversaire sans réagir ! Je dois aussi ajouter que pour le 40me nous avons eu la participation active de M. Ralph Duchamps que nous remercions encore aujourd'hui. N'empêche, ce fut un très gros travail qui nous a valu de nombreuses heures de discussions !

Par la même occasion, je voudrais encore vivement rappeler que toute personne désirant faire partie de ce comité est évidemment le bienvenu. Il n'y a pas de condition, sinon celle de faire partie de la Société en tant que membre ordinaire, et bien sûr, de passer par les élections. il y aura du travail pour tous !

1.6 Les membres

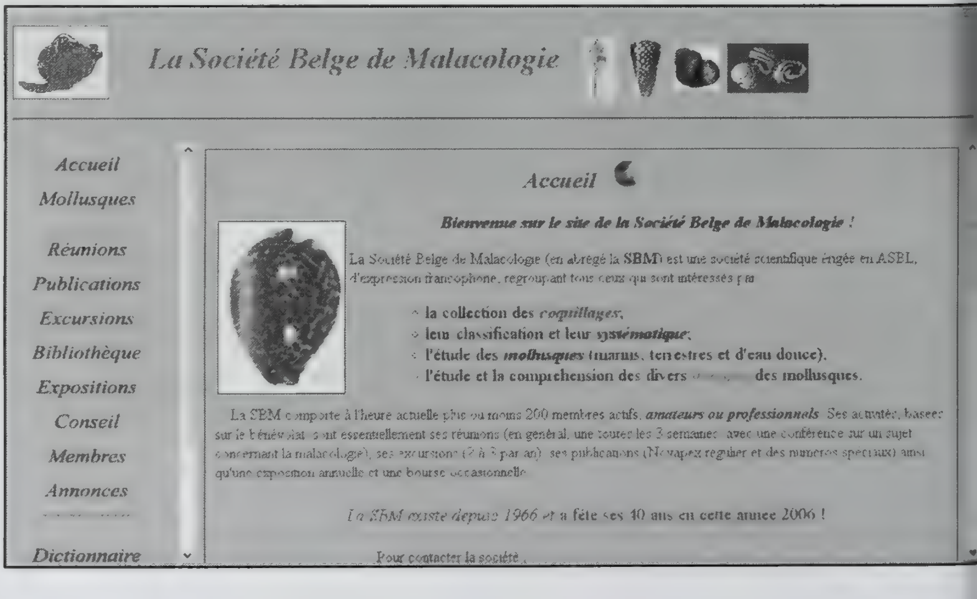
Nous comptions 140 membres effectifs en ordre de cotisation pour 2006 dont une douzaine d'institutions (sans compter les membres familiaux), dont 58 en Belgique, 48 en Europe (au sens large) et 34 hors Europe. Ces chiffres reflètent la stabilité devenue habituelle depuis des années. De nouveaux membres sont déjà inscrits pour 2007 !

Après le contrôle de l'année précédente quant à l'intérêt de certains échanges, nous comptions, en 2006, 37 échanges.

1.7 Le site web

Notre site (http://**www.sbm.be.tf**) a fait peau neuve mais ce n'est que cosmétique : il reste, avec sa **soixantaine de pages html** agrémentées de nombreuses photos :

- un fournisseur d'informations, générales (présentation de la SBM, de ses contacts, présentation de la malacologie, dates des grandes marées) et plus pratiques (agenda des réunions et excursions, annonce et informations pratiques pour les excursions, aspects divers de la vie de la société, table des matières de Novapex par auteurs),
- mais aussi une référence didactique (index des articles de Novapex depuis sa création, dictionnaire de malacologie en français, bibliographies de malacologues célèbres, description d'expéditions maritimes célèbres ainsi que nombreux liens utiles.



Bienvenue sur le site de la Société Belge de Malacologie !

La Société Belge de Malacologie (en abrégé la SBM) est une société scientifique érigée en ASBL, d'expression francophone, regroupant tous ceux qui sont intéressés par

- **la collection des *coquillages*,**
- **leur classification et leur *systématique*,**
- **l'étude des *mollusques* (marins, terrestres et d'eau douce),**
- **l'étude et la compréhension des divers [illegible] des mollusques.**

La SBM comporte à l'heure actuelle plus ou moins 200 membres actifs, ***amateurs ou professionnels***. Ses activités, basées sur le bénévolat, sont essentiellement ses réunions (en général, une toutes les 3 semaines, avec une conférence sur un sujet concernant la malacologie), ses excursions (2 à 3 par an), ses publications (Novapex regulier et des numeros speciaux) ainsi qu'une exposition annuelle et une bourse occasionnelle.

La SBM existe depuis 1966 et a fêté ses 40 ans en cette année 2006 !

Pour contacter la société.

1.8 La bibliothèque

La bibliothèque c'est:

- Plusieurs milliers de revues en provenance des quatre coins du monde.
- Plusieurs dizaines de livres sur le thème de la malacologie.
- Des centaines de documents divers (images, articles,...).
- Une base de données avec plusieurs milliers de références d'articles (CD-rom et papier).

La bibliothèque en 2006 :

- S'est enrichie de plusieurs dizaines de revues qui viennent compléter les séries existantes.
- De nouveaux échanges.
- Le prêt d'une centaine de revues aux membres.
- La recherche d'articles et de documents sur des thèmes divers.

La bibliothèque en 2007 poursuit les buts suivants :

- Accroître le nombre de revues et de livres.
- Augmenter l'intérêt de nos membres en les sensibilisants à la richesse des documents disponibles.

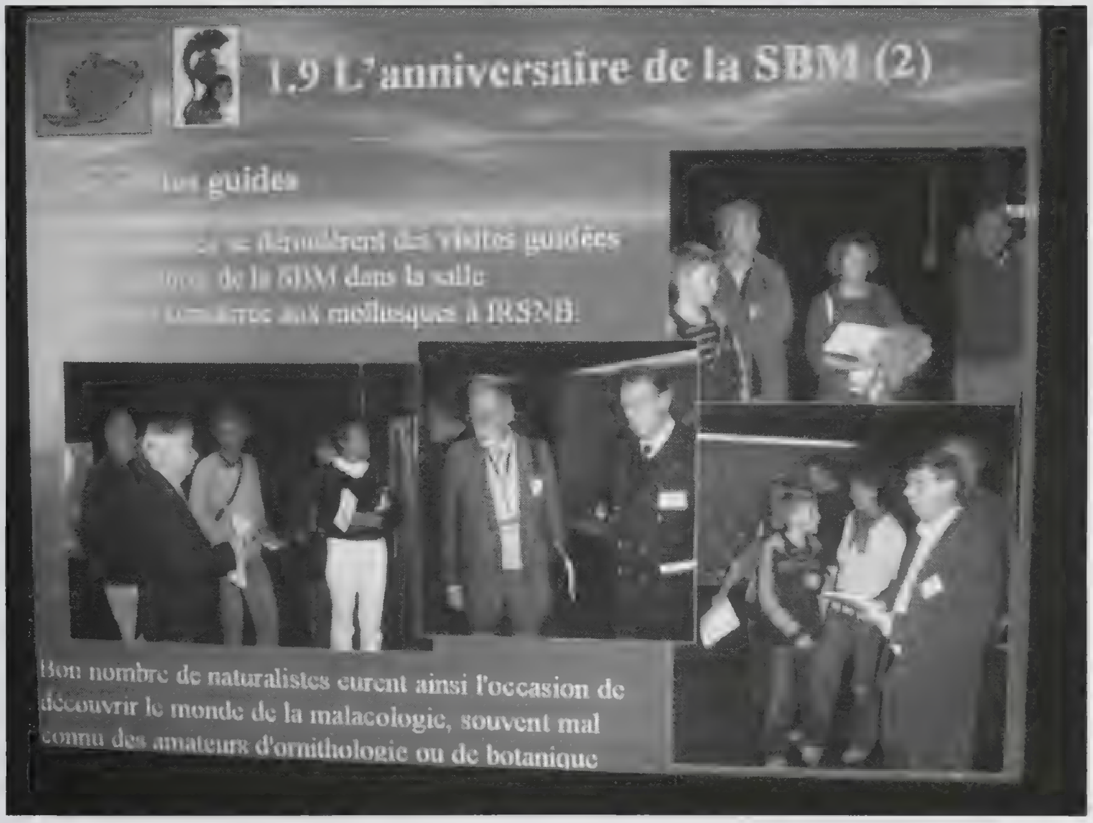
Les services offerts sont :

- Le prêt direct de revues après la présentation par Claude lors des réunions.
- Le prêt sur demande de livres et de revue sur simple demande (Par courrier, @mail ou par téléphone)
- La recherche de références sur un thème dans la base de données.
- L'envoi des articles et revues désirés par la poste moyennant un petit délai.

N.B.: Un cotisation de 0.50 Euros est demandée par revue empruntée. Les frais d'envois éventuels sont comptés au prix coûtant.

1.9 La fête anniversaire des 40 ans de la SBM

Je pense qu'il n'y a pas grand-chose à ajouter au compte-rendu paru dans le Novapex/Société du 10 Mars 2007. Nous aimerions cependant combler un oubli dans ce compte-rendu. En effet, en citant les visiteurs étrangers nous avons omis de citer (bien involontairement) Paolo CROVATO, secrétaire de La Societa Italiana di Malacologia qui nous accompagna durant toute l'après-midi.



1.9 L'anniversaire de la SBM (2)

Les guides

[illegible] se déroulèrent des visites guidées
[illegible] de la SBM dans la salle
[illegible] aux mollusques à l'IRSNB.

Bon nombre de naturalistes eurent ainsi l'occasion de découvrir le monde de la malacologie, souvent mal connu des amateurs d'ornithologie ou de botanique

2. RAPPORT FINANCIER

Bilan de l'exercice 2006

Solde créditeur au 1er janvier 2006	19.645,30 €	
Cotisations	6.040,76 €	
Vente publications	918,29 €	
Tirés-à-part	36,45 €	
Remboursement planches couleur	280,00 €	
Dons anonymes	403,64 €	
Intérêts fond de roulement	226,53 €	
Publicité	280,00 €	
Subsides Région Wallonne	991,58 €	
Frais de publication		7.446,73 €
Frais d'expédition		1.415,10 €
Location boîte postale		60,00 €
Abonnements aux revues		331,78 €
Gestion Banque de la Poste		29,00 €
Divers		310,16 €
40ème anniversaire		772,20 €
Totaux	28.822,55 €	10.364,97 €
Solde créditeur au 31 décembre 2006		18.457,58 €
Total général	28.822,55 €	28.822,55 €

Prévisions budgétaires pour 2007

Solde créditeur au 1er janvier 2007	18.457,58 €	
Cotisations	6.000,00 €	
Frais de publication		8.000,00 €
Frais d'expédition		1.600,00 €
Location salle		240,00 €
Location boîte postale		60,00 €
Abonnements aux revues		350,00 €
Gestion Banque de la Poste		30,00 €
Divers		500,00€
Totaux	24.457,58 €	10.780,00 €
Solde créditeur au 31 décembre 2007		13.677,58 €
Total général	24.457,58 €	24.457,58 €

La trésorière,

A. Langlet.

Le président,

3. ELECTIONS

Personne ne devant se représenter cette année, tout reste comme avant étant donné que nous n'avons pas non plus enregistré de démission.

4. COTISATIONS 2008

Les cotisations sont restées inchangées depuis janvier 2003. Pendant 5 ans nous avons donc payé 35 euros pour les membres habitant la Belgique et 50 euros pour les membres habitant l'étranger. En cinq ans pourtant nous en avons connues des améliorations et des planches couleurs supplémentaires et de meilleures qualités. Les factures de l'imprimeur ont ipso-facto également été améliorées et revues à la hausse (ce qui est tout à fait normal lorsque l'on sait qu'une planche couleur coûte l'équivalent de 280 euros).
Pourtant, et ceci en partie grâce au subside alloué par le Lotto et la région wallonne d'abord, ensuite par la région wallonne seule, nous n'avons pas dû augmenter la cotisation. La balance de nos entrées et de nos dépenses est restée en équilibre pendant 5 ans.

Malheureusement, cette année le subside alloué par la région wallonne a été diminué, sans raison apparente. Ceci ajouté aux frais d'envoi, car là aussi en 5 ans nous avons subi quelques augmentations, et aux rentrées moins importantes, nous mène cette année à un déficit budgétaire de plus de 1000 euros (voir le rapport financier). Pour 2008 l'alternative suivante a été proposée:

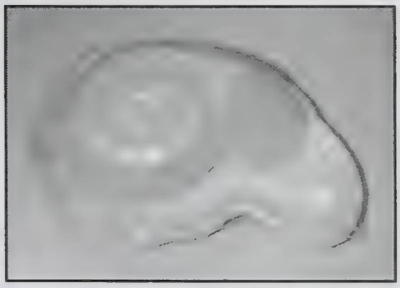
Nous proposons une augmentation de 5 euros pour les cotisations et les abonnements, soit une cotisation de 40 euros pour la Belgique et 55 euros pour l'étranger à partir de janvier 2008 SI et seulement SI nous nous apercevons qu'au cours de l'année 2007 nos subsides n'augmentent pas ou si nos finances plongent encore plus bas. Car si nos finances ne connaissent plus de baisse, la situation s'améliorera automatiquement et ne nécessitera plus d'augmentation de la cotisation.

Nous en saurons sans doute plus en septembre 2007. Nous vous proposons donc cette alternative : si à la date du 1^{er} septembre 2007 nous nous apercevons que notre budget est encore déficitaire nous augmenterons les cotisations et les abonnements de 5 euros à partir de janvier 2008.

Cette proposition a été acceptée par un vote à main levée.

5. DIVERS

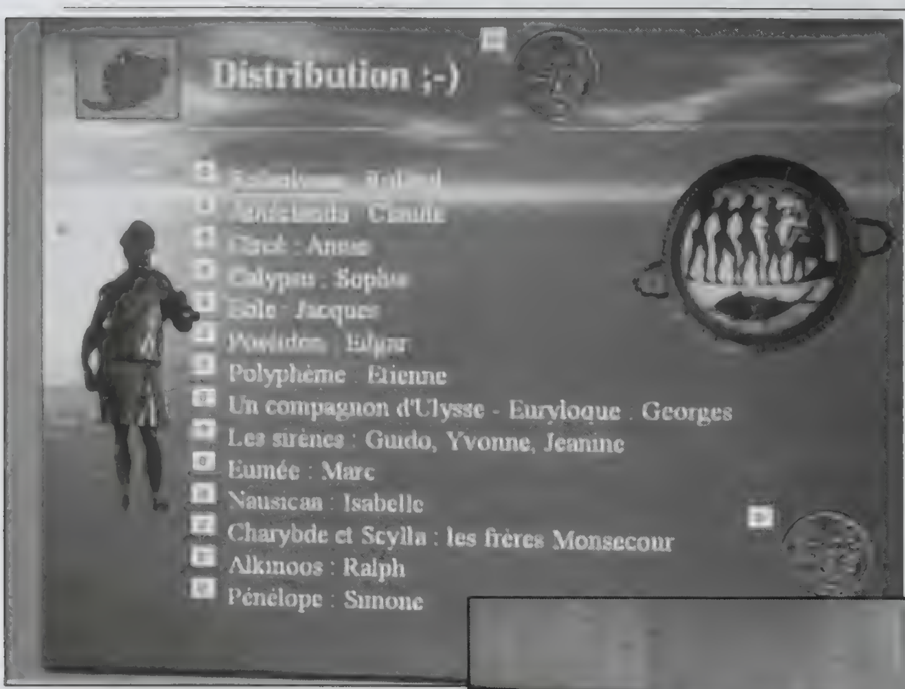
C'est devenu une tradition : l'AG se termine apr un ptite cadeau pour tous les membres présents. Cette année, comme les réveillons n'étaient pas encore très loin, nous avons offert à chaun une bougie en forme de coquillage présentée sur un plateau décoré d'autres coquillages. Gageons que bien peu brûleront réellement leur bougie ;-) !



Comme tous les ans un verre de l'amitié a clôturé cette Assemblée Générale.

En fin de journée, les membres du comité se sont réunis pour élire Président, vice-président, secrétaire et trésorière.

MERCI A TOUS d'être venu nous soutenir lors de cette Assemblée Générale !
Merci du fond du cœur !



Distribution ;-)

- [illegible] : Roland
- Anticlea : Claude
- Circé : Anne
- Calypso : Sophie
- Eole : Jacques
- Poséidon : Edgar
- Polyphème : Etienne
- Un compagnon d'Ulysse - Euryloque : Georges
- Les sirènes : Guido, Yvonne, Jeanine
- Eumée : Marc
- Nausicaa : Isabelle
- Charybde et Scylla : les frères Monsecour
- Alkinoos : Ralph
- Pénélope : Simone

L'écho des réunions

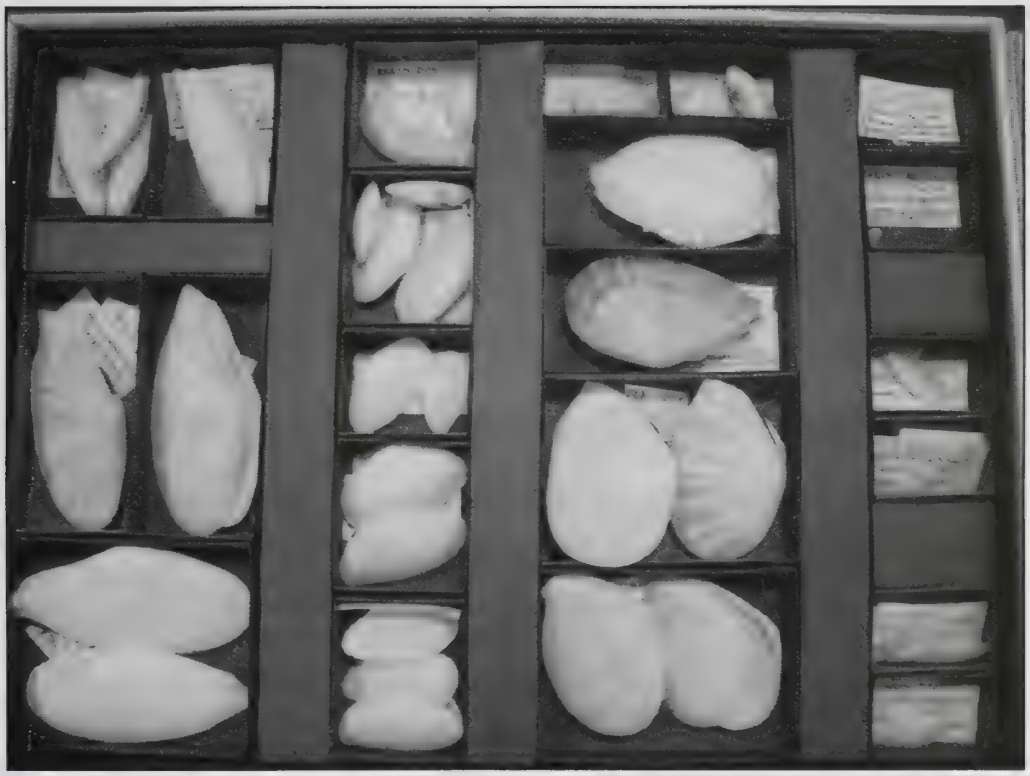
Etienne MEULEMAN

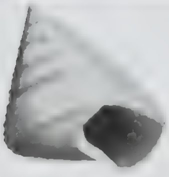
Réunion du 3 mars 2007 (EM) ➔ **Annie Langleit : Les Tellinidae : la sous famille des Tellininae (suite).**

Notre spécialiste des bivalves, nous a présenté la suite de son étude sur la famille des Tellinidae. Elle avait choisi de nous parler du sous-genre *Tellinella* Mörch, 1853.

Après un rapide rappel sur les caractères généraux de cette belle famille (charnières, dents, sinus palléal), notre oratrice a plongé dans le vif du sujet en nous expliquant les caractères distinctifs du sous-genre étudié. Elle n'a pas oublié de nous énumérer les multiples synonymes présents dans la littérature.

Par la suite, nous avons pu découvrir les quelques 25 espèces constituant le sous-genre. Pour chacune d'elle, nous avons eu droit à une description sommaire et à une présentation de la coquille. Il y en avait des rares et des moins rares, des grandes et des moins grandes, avec des sculptures bombées, anguleuses, lamelleuses ou écailleuses,… bref, nous en avons eu pour notre argent. Merci à Annie pour ce travail de préparation fastidieux et sa présentation plaisante. A quand la suite ?





Quoi de neuf ?

Claude VILVENS

W M
Antwerp, Belgium
15 - 20 July 2007

museum

Universiteit
Antwerpen

## WORLD CONGRESS OF MALACOLOGY
ANTWERP, BELGIUM, 15-20 JULY 2007

The congress will be held on campus « Groenenborger » of the University of Antwerp. It is the 16th International Congress of UNITAS MALACOLOGICA (UM). The congress will also host the 73rd annual meeting of the AMERICAN MALACOLOGICAL SOCIETY (AMS). All payments will be in EUROS (€).

The congress is open for all contributions in the field of malacology and will host several exciting, open symposia, including:

- « Sexual selection » (organised by R. Chase & J. Koene)
- « Micromolluscs » (organised by D. Geiger)
- « Molluscs as models in evolutionary biology : From local speciation to global radiation » (organised by M. Glaubrecht & T. von Rintelen)
- « Molluscan models : Advancing our understanding of the eye » (organised by J. Serb & L. Robles)
- « Inventorying the molluscan fauna of the world : frontiers and perspectives » (organised by P. Bouchet & S. Panha)
- « Neogastropod origins and evolution » (organised by J. Harasewych)

There will also be a contributed papers session and a poster session, with posters on display throughout the conference. The conference will start with an « icebreaker » on Sunday late afternoon, 15 July 2007. The scientific presentations are organised in four parallel sessions on Monday, Tuesday, Thursday and Friday. During the poster presentation on Tuesday evening there will be a reception with wine, typical Belgian degustations, cheese and of course… a selection of Belgian beers. On Thursday evening AMS will host its annual auction of molluscan books and paraphernalia (no specimens) to benefit its student programs. The conference dinner will be on Friday evening (several options are still being considered). Wednesday is a free day during which participants can discover the many historical and beautiful places in Antwerp. They can also join one of the suggested congress activities or do whatever they want, of course !

Convenient, though modest accommodation will be available at the university campus. Hotel accommodation will be provided in the city centre of Antwerp, near « Antwerpen Centraal » railway station, the main bus terminals and the shuttle bus from/to Brussels international airport. Prices range from 47.5 € (singles) to about 155 € (4 persons) per room per night (breakfast included).

Additional info can be obtained at : wcm@naturalsciences.be

Useful websites :

Website of UNITAS MALACOLOGICA :
http://www.ucd.ie/zoology/unitas/

Website of the AMERICAN MALACOLOGICAL SOCIETY:
http://www.malacological.org

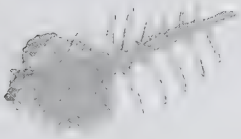
Thierry Backeljau
President of Unitas Malacologica

Association Française de Conchyliologie - Section Nord
avec le concours de la ville de Faches-Thumesnil
organise les

11èmes Journées Internationales des Coquillages
BOURSE / EXPOSITION

les **8** et **9** Septembre **2007**
Salle des Fêtes, Jacques Brel, de Faches-Thumesnil

Informations et renseignements complémentaires auprès de:
Mr. Michel GHESQUIERE
97 Route de Wervicq 59560 Comines (F)
03.20.39.09.13 michel.ghesquiere@tele2.fr



Quelques nouvelles publications

Claude VILVENS

Les animaux étranges du bord de mer

par **M. Loir**

pp. 1-32, 75 photos couleur.
Prix: 6.07 EUR.

Format: 192 x 258 mm, couverture souple.
Editeur: Ouest-Fance, Rennes, 2007

nature
Les animaux étranges du bord de mer

Ce petit fascicule appartient à la même famille ("Découverte nature" chez Ouest-France) qu'un autre ouvrage présenté dans ces colonnes il y a quelques temps, à savoir "Les coquillages des côtes françaises" de P. Bouchet et R. von Cosel. Cette fois, dans un format un peu plus grand et signé par M. Loir, ancien directeur de recherches à l'INRA de Renens, il s'agit d'une présentation générale des Invertébrés marins, appuyée par de magnifiques photos en couleur.

La première partie présente les groupes principaux, avec des exemples d'organismes et un schéma très clair de l'organisation anatomique de ces animaux. Sont ainsi présentés de manière très accessible Eponges, Cnidaires (Méduses et Anémones), Bryozaires (petits organismes vivant dans des loges calcaires), Vers, Crustacés, Echinodermes (Etoiles de mer et Oursins), Ascidies et bien sûr Mollusques.

La seconde partie s'intéresse aux mœurs de ces animaux et aux faits caractéristiques de leur éthologie : modes de reproduction, vie en colonie, symbioses, description plus détaillée de certains organismes (comme les Gorgones, les Hydraires, les Crustacés décapodes ou les Nudibranches) et finalement les différents modes d'alimentation (végétariens, filtreurs, détritivores, limivores et carnivores comme les Etoiles de mer et les Nudibranches mangeurs d'Eponges et de Cnidaires).

Ce petit livre est une petite merveille et, en plus, comme de coutume chez Ouest-France, il ne coûte pas cher : je l'ai payé un peu plus de 6 EUR (non, on ne me l'a pas donné pour que j'ne dise du bien ;-)). Certes, on parle un peu des Mollusques et beaucoup des animaux qui partagent leur milieu de vie : mais ce serait dommage de s'en priver !

Claude Vilvens

Nous avons reçu

Claude VILVENS

BELGIAN JOURNAL OF ZOOLOGY

(Belgique)
Vol. 136, N° 2, juillet 2006

Un peu de tout : Acariens, Araignées, Cnidaires, Crustacés, Poissons et Oiseaux – mais pas de Mollusques.

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(U.S.A. – Californie)
Vol. XXXIX, N°11, janvier 2007

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Vol. 58, N°3, novembre 2006

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30 La chasse aux *Typhis* par D. Gratecap
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Vol. 37-38, N°2, 2004-2005

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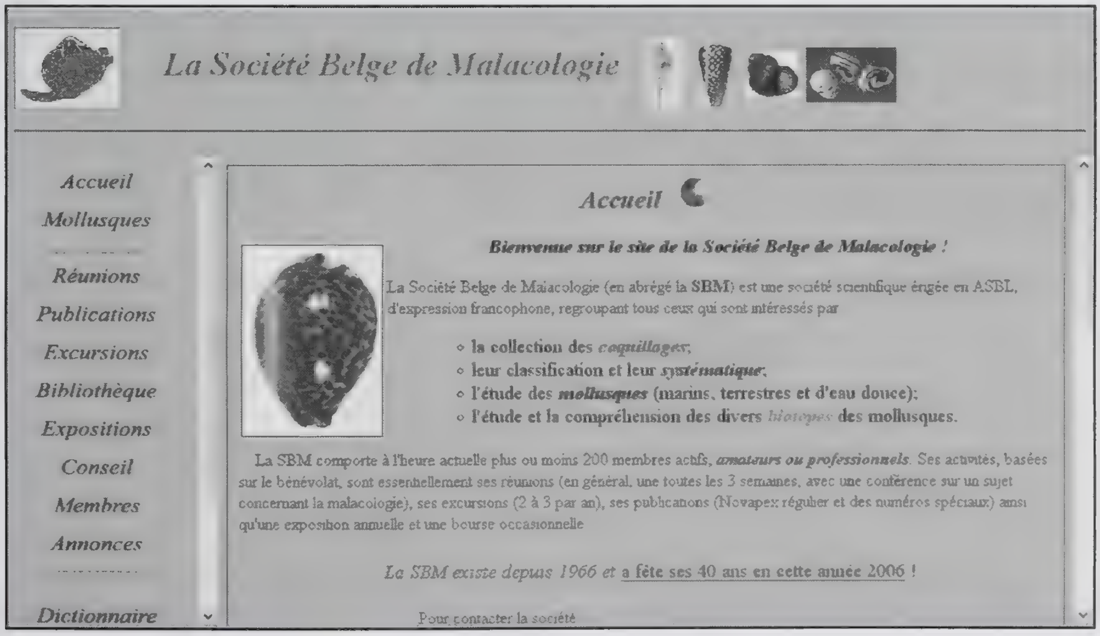
Des nouvelles en direct de la SBM ? http://users.swing.be/sw216502 ou http://www.sbm.be.tf



Accueil

Bienvenue sur le site de la Société Belge de Malacologie !

La Société Belge de Malacologie (en abrégé la SBM) est une société scientifique érigée en ASBL, d'expression francophone, regroupant tous ceux qui sont intéressés par

- **la collection des *coquillages*;**
- **leur classification et leur *systématique*;**
- **l'étude des *mollusques* (marins, terrestres et d'eau douce);**
- **l'étude et la compréhension des divers *biotopes* des mollusques.**

La SBM comporte à l'heure actuelle plus ou moins 200 membres actifs, ***amateurs ou professionnels***. Ses activités, basées sur le bénévolat, sont essentiellement ses réunions (en général, une toutes les 3 semaines, avec une conférence sur un sujet concernant la malacologie), ses excursions (2 à 3 par an), ses publications (Novapex régulier et des numéros spéciaux) ainsi qu'une exposition annuelle et une bourse occasionnelle

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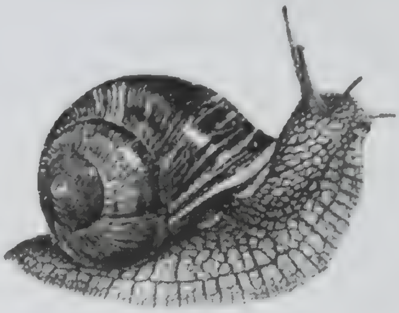

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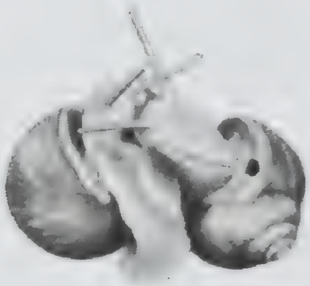

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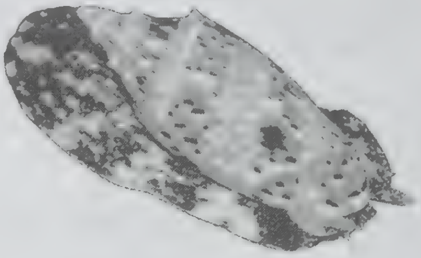

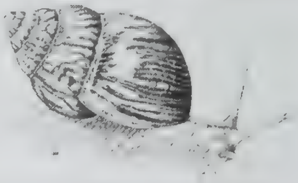

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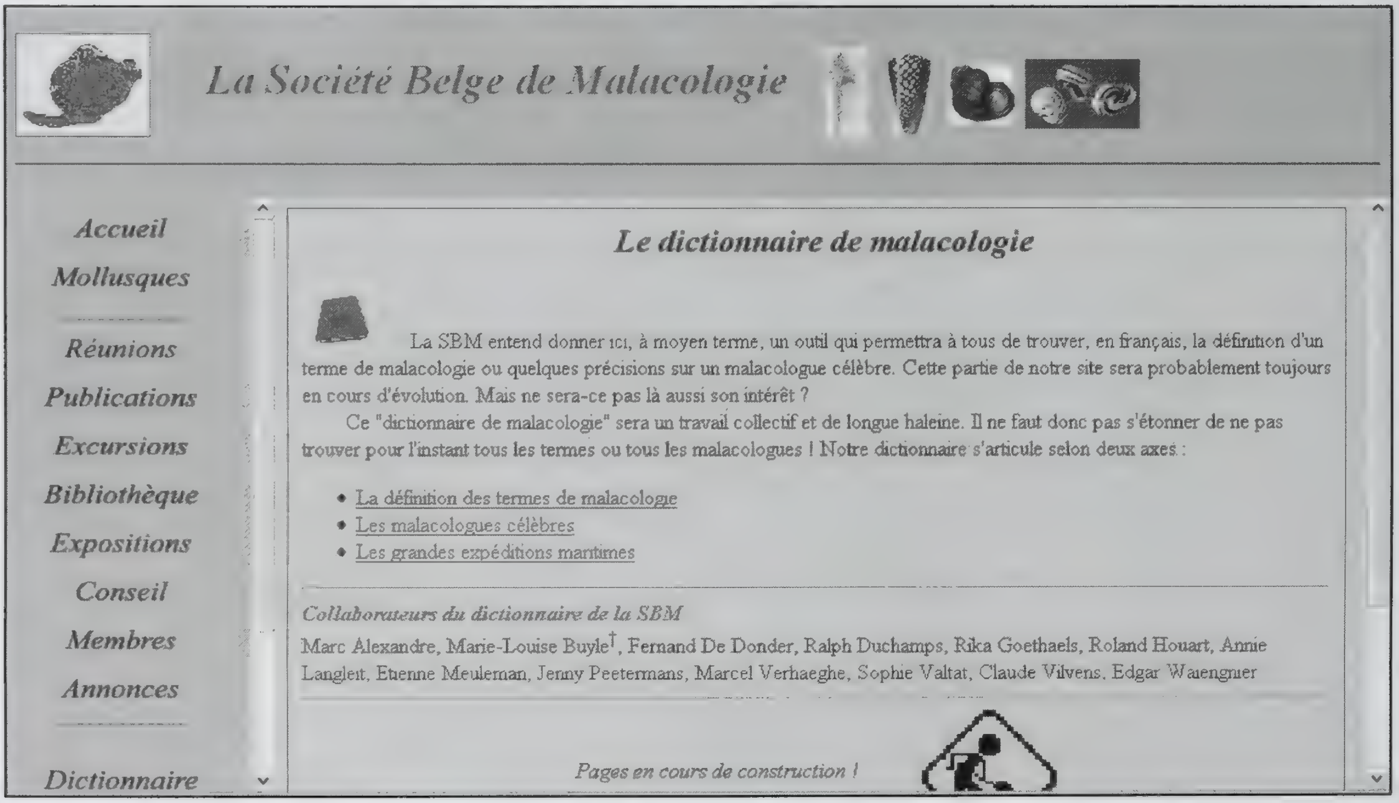

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Christiane DELONGUEVILLE et Roland SCAILLET

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Février	Dimanche 18	101 - 105
	Lundi 19	108 - 110
	Mardi 20	110 - 108
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Mars	Dimanche 18	(95) - 102
	Lundi 19	108 - 113
	Mardi 20	115 - 116
	Mercredi 21	115 - 112
	Jeudi 22	107 - 101
Avril	Lundi 16	(96) - 102
	Mardi 17	107 - 111
	Mercredi 18	112 - 112
	Jeudi 19	110 - 107
	Vendredi 20	102 - (95)
Mai	Mercredi 16	(98) - 100
	Jeudi 17	102 - 101
	Vendredi 18	100 - (97)
Juin	-	-
Juillet	-	-
Août	Mercredi 29	100 - 103
	Jeudi 30	106 - 107
	Vendredi 31	106 - 104
Septembre	Samedi 1	100 - (95)
	Mercredi 26	(96) - 102
	Jeudi 27	107 - 110
	Vendredi 28	112 - 112
	Samedi 29	110 - 107
	Dimanche 30	101 - (95)
Octobre	Jeudi 25	(96) - 101
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Annuaire des Marées pour l'année 2007 - Tome I - Ports de France - SHOM (Service Hydrographique et Océanographique de la Marine) - *Paris - 201 pp.*

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SOCIETE BELGE DE MALACOLOGIE

Amiantofusus gen. nov. for *Fusus amiantus* Dall, 1889 (Mollusca: Gastropoda: Fasciolariidae) with description of a new and extensive Indo-West Pacific radiation

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KEYWORDS. Gastropoda, Fasciolariidae, Buccinidae, *Fusus amiantus*, *Fusus thielei*, Madagascar, Reunion, Taiwan, Coral Sea, New Caledonia, Fiji, Tonga, Vanuatu, MUSORSTOM, new genus, new taxa.

ABSTRACT. In the present paper we describe the new genus *Amiantofusus* gen. nov. to accommodate the Atlantic species *Fusus amiantus* Dall, 1889. The genus belongs to Fasciolariidae and this family is confirmed as distinct from Buccinidae, based on anatomical differences. We add an Indo-West Pacific fauna of seven species described as new to science: *Amiantofusus pacificus* sp. nov. (North Fiji Basin, New Caledonia, southern Coral Sea, south West Pacific), *A. gloriabundus* sp. nov. (North Fiji Basin, Vitiaz Zone), *A. sebalis* sp. nov. (New Caledonia, Loyalty Islands, Vanuatu), *A. candoris* sp. nov. (Chesterfield Islands, Fairway), *A. maestratii* sp. nov. (New Caledonia), *A. borbonica* sp. nov. (Reunion) and *A. cartilago* sp. nov. (Mozambique Channel). In addition we add two unnamed species: *A.* species 1 (North Fiji Basin) and *A.* species 2 (Vanuatu). *Fusus thielei* Schepman, 1911 is briefly discussed, the generic placement is still uncertain.

INTRODUCTION

Recent deep-sea biodiversity exploration in the South Pacific by Institut de Recherche pour le Développement (IRD, Nouméa, formerly ORSTOM) and Muséum national d'Histoire naturelle (MNHN, Paris) has brought to light many hundreds of new or little known species of molluscs and other benthic invertebrates. As a result of these expeditions, over 400 new species of molluscs have been described from the deep waters off New Caledonia alone (see, among others, Crosnier & Bouchet 1991 and Bouchet & Marshall 2001). Also the Buccinidae and Fasciolariidae are well represented in this rich material. Results on the genus *Fusinus* from these expeditions has been presented in a paper dealing with the deeper water species of the subgenus *Chryseofusus* (Hadorn & Fraussen, 2003). The genus *Granulifusus* has been confirmed as being distinct from typical *Fusinus* and the species collected by these expeditions are presented in a second paper (Hadorn & Fraussen, 2005). The subgenus *Fusinus* is discussed in two subsequent papers (Snyder & Hadorn, 2006 and Hadorn & Fraussen, 2006).

The fusinids studied in the present paper belong to another particular group of species with a particular shape and protoconch morphology. Fasciolariidae with a peculiar protoconch with striking semilunar axial riblets has been reported from East Atlantic seamounts by Gofas (2000). This character is shared with the Indo-West Pacific Fasciolariidae presented in this paper, which are remarkably similar with the amfi-Atlantic *Fusus amiantus* Dall, 1889 in conchological characters, radula morphology and anatomy, and, consequently, are congeneric.

Amiantofusus gen. nov. has a fasciolariid radula, however the species are conchologically quite similar to Buccinidae. Therefore the anatomy of the type species, *Fusus amiantus* Dall, 1889, and one of the new Pacific species was studied. Surprisingly little is known about the anatomy of Fasciolariidae. Only a few publications (e.g. Marcus & Marcus, 1962 and Ponder, 1970) are dedicated to soft-body morphology and anatomy of this family, as well as a paper on the stomach of Buccinoidea (Kantor, 2003), including descriptions of some fasciolariid species. In the present paper we discuss the anatomical characteristics of Fasciolariidae and Buccinidae, to confirm them as distinct and to derive a correct definition for Fasciolariidae.

The material described in the present study originates from various French research vessels and expeditions in the tropical Indo-West Pacific (e.g. Richer de Forges, 1993), conducted during the last 30 years, which are part of the still ongoing sampling program to study the tropical deep-sea benthos in the Indo-Pacific, for a better knowledge of the biodiversity:

(a) MUSORSTOM 5, CORAIL 2 and EBISCO expeditions to the Coral Sea, and especially Chesterfield-Bellona Plateau (Richer de Forges *et al*, 1986, Richer de Forges, 1990).
(b) BATHUS 1, 2 & 3, BIOCAL, HALIPRO 1, BIOGEOCAL, CHALCAL 2, SMIB 3, 4 & 8, MUSORSTOM 6, NORFOLK 1 & 2 and BERYX 11 expeditions off eastern and southern New Caledonia (Loyalty Basin) and Loyalty Ridge (Richer de Forges & Chevillon, 1996).
(c) BATHUS 4 and MUSORSTOM 4 expeditions off northern New Caledonia.
(d) MUSORSTOM 7 expedition to the Fiji Basin.
(e) VOLSMAR and MUSORSTOM 8 expeditions to Vanuatu and the New Hebrides Arc (Volcanos Hunter & Matthew) (Richer de Forges *et al*, 1996).
(f) BORDAU 2 expedition to Tonga (no published cruise report yet).
(g) TAIWAN 2000 expedition to Taiwan (no published cruise report yet).
(h) MD32 expedition off Reunion.
(i) Material recently obtained as a by-product of commercial shrimp fisheries in the Mozambique Channel off Madagascar and offered to collectors.

Material from the French expeditions is, unless otherwise stated, deposited in MNHN. The material is, unless being a type (which are allocated to catalogue numbers), unambiguously designated and retrievable by the combination of expedition acronym and station number.

Abbreviations

AMNH: American Museum of Natural History, New York, USA
AMS: Australian Museum, Sydney, Australia
EM: collection Eric Monnier, France
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ZMA: Zoologisch Museum Amsterdam, Netherlands
alc: in alcohol collection
dd: empty shell, dead collected
juv: juvenile or subadult
lv: collected alive, animal dried
BI: chalut double perches Blake (Blake trawl)
CHG: chalut à perches (beam trawl)
CC: chalut à crevettes (otter trawl for shrimp)
CP: chalut à perches (beam trawl)
DC: drague Calypso (Calypso dredge)
DE: drague épibenthique (epibenthic dredge)
DP: petite drague à roche (small rock dredge)
DW: drague Warén (Warén dredge)
dr: dragage (dredging)
stn: station

Abbreviations on figures

aoe – anterior oesophagus
cept – cephalic tentacles
cme – cut mantle edge
ct – ctenidium
dg – digestive gland
dgL – duct of the gland of Leiblein
fpg – female pallial gonoduct
gL – gland of Leiblein
hg – hypobranchial gland
int – intestine
lsg – left salivary gland
nep – nephridium
ng – nephridial gland
nr – circumoesophageal nerve ring
op – operculum
os – osphradium
ov – ovary
p – penis
per – pericardium
poe – posterior oesophagus
pr – proboscis within rhynchodaeum
prp – propodium
prr – proboscis retractor
re – rectum
rsg – right salivary gland
s – siphon
sd – salivary duct
semd – seminal duct visible through penis wall
st – stomach
tes – testis
vd – vas deference
vL – valve of Leiblein

SYSTEMATICS

Family **FASCIOLARIIDAE** Rafinesque, 1815

Diagnosis and discussion. It is not easy to draw clear distinction between Fasciolariidae and Buccinidae, which have rather similar anatomy. Traditionally the differentiation has been made on the basis of the radula. Fasciolariidae possess the broad lateral teeth with many cusps (more than 5) and very small central and narrow tooth with 1 to several weak cusps. Buccinidae, on the contrary are usually having 2-4 cusps on the laterals and relatively much broader, subsquare central tooth with 3-4 cusps. In fact this is not that straightforward. There are some genera which have basically the fasciolariid radula type, but classified within Buccinidae. One of these genera is *Thalassoplanes* Dall, 1908. The radula was illustrated by Bouchet & Warén (1986: pl. 1, fig. 5) and it is superficially very similar to that of *Fasciolaria.* The anatomy of *Brevisiphonia circumreta* Lus, 1973 (the type species of *Thalassoplanes*) was described by Lus (1973), who attributed the genus to Fasciolariidae. Similarly, *Troschelia berniciensis* (King, 1846) has "fasciolariid-like" lateral radular teeth with 5-10 cusps (Bouchet & Warén, 1985: figs 484-485), but it was attributed by the latter authors to Buccinidae.

Although Ponder (1970) concluded, that there are no reliable anatomical differences, that readily distinguish the families of Buccinoidea; Kantor (2003) stated that stomach anatomy is similar in all Fasciolariidae examined and allows to distinguish them from other Buccinoidea in a combination of characteristics, particularly in the absence of the posterior mixing area (sometimes called as caecum), in the low relief of the folds on the inner stomach wall, in the presence of transverse striations on the low longitudinal fold, in the absence of clear differentiation of the gastric chamber into dorsal and ventral parts.

The foregut anatomy is rather uniform in all buccinoideans, and is characterized by a long proboscis, large paired or fused acinous salivary glands, a usually well developed valve and gland of Leiblein, and by the absence of accessory salivary glands. Nevertheless there are some minute differences, that seems to be important. One of them is the passage of the ducts of the salivary glands. In Buccinidae the ducts, after leaving the glands, are following freely along the anterior oesophagus towards the anterior part of the proboscis, where they enter the walls of the oesophagus close to their entrance into the buccal cavity. In Fasciolariidae to the contrary (*Leucozonia nassa*, by Marcus & Marcus, 1962), the ducts, shortly after leaving the glands, enter the anterior oesophagus walls in front of the valve of Leiblein. They follow to their openings into the buccal cavity under the lateral folds of the oesophagus. Ponder (1970) unfortunately did not write anything specific on the ducts in his description of the anatomy of *Microfulgur carinatus* Ponder, 1970.

The second characteristic are the proboscis retractor muscles. In Buccinidae the retractors are usually numerous and are attached in bundles laterally to the median to the proboscis sheath (= rhynchocoel). In Fasciolariidae there are either the single pair of the retractors, or even there can be a single powerful retractor, attached to rhynchocoel (Ponder, 1970; Marcus & Marcus, 1962 and Kantor, unpublished).

The combination of the above mentioned characteristics, that are multicuspid lateral radular teeth together with very small central tooth, single or paired proboscis retractors, salivary ducts passing within the oesophagus walls and characteristic stomach morphology seems to allow to diagnose Fasciolariidae confidentially.

It also should be specified, that only the combination of all these characteristics confirms the placement of a genus within Fasciolariidae, while single character may be present in Buccinidae as well. Thus, *Thalassoplanes* possesses a clearly fasciolariid radula, but the stomach has a very long posterior mixing area and salivary ducts which pass freely along the anterior oesophagus (Lus, 1973).

Amiantofusus gen. nov. possesses the anatomical characters, mentioned above for Fasciolariidae: position of the salivary ducts, the single or paired proboscis retractors, as well as stomach morphology, all very similar to that of other Fasciolariidae (although due to fixation we were not able to examine it in details). The combination of these characters allows us to prove the position of the genus within Fasciolariidae.

Genus ***Amiantofusus*** gen. nov.

Type species: *Fusus amiantus* Dall, 1889, amfi-atlantic (West Atlantic: northern Caribbean. East Atlantic: around Azores).

Description. Shell small to medium, white, yellowish, pale brown to orange-brown, fusiform, slender, with high spire and rather short siphonal canal.

Protoconch multispiral, pointed, with 3 - 3 1/2 whorls. First whorls smooth, glossy. Last whorl with fine but strong, semilunar, axial riblets and with 1, occasionally 2, fine suprasutural spiral cord(s).

Teleoconch whorls ornamented with spiral cords, weak or invisible in the axial interspaces, forming well developed knobs on the axial ribs. Their number increasing from 2 (occasionally 3) on the first whorl to 4-6 on penultimate whorl. Most species develop secondary spiral cords.

Aperture ovate to narrow, more or less pinched at both ends. Outer lip simple, usually thin. Columella smooth, callus thin. Outer lip and columella usually with one or more internal knobs or lirae (fully adult specimens), adapical columellar knob occasionally strong. Most specimens (subadult) without internal

knobs or lirae inside outer lip. Siphonal canal short, broad, open.
Operculum corneus, thin, pale brown, rather small, elongate, nucleus terminal.

Radula with small, narrow, tricuspid central tooth with elongate base. Lateral teeth broad, slightly curved, with 4 major cusps accompanied by a small knob or cusp at both ends.

Anatomy and operculum of *Amiantofusus amiantus* (Dall, 1889), was studied in an adult male (spire length 14.0 mm, body whorl length 8.3 mm, apertural length 5.6 mm, siphonal width 5.3 mm. Shell with 3.8 protoconch and 5.75 teleoconch whorls) from Meteor Bank (central Atlantic), SEAMOUNT 2, stn DW180.
Body light yellow (preserved), digestive gland light orange, testis slightly lighter, upper whorls were torn off by extracting the body from the shell, mantle cavity spanning slightly over 1/2 whorl. Nephridium narrow spanning about 1/5 whorl, nephridial gland narrow, with transparent walls (Fig. 6 – **ng**). Lobes of the digestive gland fuse without distinct border. The gland occupies the ventral part of the upper whorls of visceral mass, the border line between digestive gland and the testis is slightly wavy (Fig. 1).
Foot thick, with subrectangular sole, rounded posteriorly. Propodium narrow (Fig. 2 – **prp**), separated from metapodium by very narrow and shallow propodial cleft. Operculum (Fig. 1 – **op**) completely transparent, light yellow, very thin, elongate-oval, with terminal nucleus, nucleus eroded. Growth lines very thin, inconspicuous, and numerous. Operculum attached along short oval area (under 1/2 of operculum length) to opercular pad. Head medium-sized, poorly differentiated from the foot, tentacles long (Figs 2-3 – **cept**), closely spaced at the bases, conical with distinct black eyes, at tentacles bases.
Mantle cavity. Mantle cavity is in all respects similar to that of *Amiantofusus pacificus* (Fig. 9), long, its length about 1 1/2 the width, edge even and thickened when animal is contracted. Mantle wall very thin, osphradium, ctenidium, pallial gonoduct, and hypobranchial gland visible by transparency. Siphon with thick and contracted walls, short, very slightly extending beyond mantle edge. Ctenidium large, but narrow, occupying about 0.9 of mantle length, consisting of simple tall triangular lamellae. Osphradium twice as wide as ctenidium and 0.6 of its length, assymmetrical, with broad axis. Its lamellae on the right side are wider than on the left side, especially in the anterior part in proximity to the mantle edge. Hypobranchial gland indistinct, narrow, lacking folds, covered with thick mucus layer. Rectum narrow, thin-walled, of similar diameter along its length, without terminal papilla. Rectal gland absent.
Alimentary system (Figs 4-6). Proboscis medium long in contracted state (about 1.8 mm, or 0.32 aperture length), with smooth walls, occupying most of rhynchocoel length, rhynchodeum semitransparent. Proboscis narrow, length about 5.5 diameter. Mouth opening broad (Fig. 5) compared to proboscis diameter, in the shape of dorso-ventrally compressed narrow slit. Proboscis retractor large (Figs 4-5 – **prr**), unpaired, attached to the rhynchodaeum ventrally at its mid-length.
Oesophagus leaving proboscis posteriorly is broad, rounded in section and forming very long loop (Fig. 5). Valve of Leiblein large (Fig. 5 – **vL**), comparing to oesophagus diameter, pyriform, the ciliar conical valve is visible through transparency of the walls of the valve. The valve is situated anterior to proboscis tip, when the latter is retracted. Oesophagus narrow immediately posterior to the valve and passing through the nerve ring. Circumoesophageal nerve ring comparatively large (Fig. 5 – **nr**), concentrated, covered with thick connective-tissue layer, that is obscuring the borders between ganglia. Mid-oesophagus after passing through the nerve ring slightly widens, covered with loose connective tissue, which is obscuring the duct of the gland of Leiblein. Posterior oesophagus (posterior to the opening of the duct of the gland of Leiblein) of the same diameter along its length, thin-walled. Gland of Leiblein long (Figs 4-5 – **gL**), light yellow-brownish, tubular, uncoiled, tapering posteriorly.
Salivary glands large, situated on both sides of anterior part of rhynchodaeum and the circumoesophageal nerve ring, completely covering the latter (Figs 4-5 – **rsg, lsg**). The glands are semi-transparent, off white, judging from the external view acinous. Salivary ducts leaving the glands and fused with the walls of the oesophagus immediately anterior to the valve of Leiblein. The duct of the left salivary gland is much thicker, than that of the right gland. The ducts are visible through the oesophagus wall by transparency, as they follow anteriorly (Fig. 5 – **sd**). Accessory salivary glands absent. Stomach small (Fig. 6 – **st**), broadly U-shaped, without posterior mixing area. The outer stomach wall is covered by thin but distinct transverse folds visible by transparency. Posterior oesophagus opens into the stomach vetro-posteriorly (Fig. 6 – **poe**). Due to fixation it was impossible to study stomach anatomy.
Reproductive system. Penis is medium long (Fig. 3 – **p**), rounded in section at the base and more flattened closer to the apex, slightly narrowing towards the tip. Seminal duct is clearly visible by transparency. Seminal opening lacking papilla.

Comparison. *Amiantofusus* gen. nov. is characterized by the multispiral protoconch, with semilunar axial ribs and 1, occasionally 2, suprasutural spiral cords, in combination with strong axial sculpture and short siphonal canal.
Subadult specimens are more common than full adults. The shape of adult shells can differ considerably by a proportionally larger aperture and shorter siphonal canal.

The presence of a protoconch with peculiar semilunar axial ribs in combination with one or more suprasutural spiral cords is shared with the East Atlantic fasciolariid species "*Latirus*" *rugosissimus* (Locard, 1897) and buccinid *Antillophos* species (Indo-West Pacific and Caribbean). Some of these species are more common on seamounts (*Antillophos alabastrum* (Fraussen, 2003) and *Antillophos boucheti* (Fraussen, 2003)). For a discussion of East Atlantic seamount species with axial ribs on the protoconch (although not all semilunar) we refer to Gofas (2000).

Species of the deep-water subgenus *Fusinus* (*Chryseofusus*) Hadorn & Fraussen, 2003 have a short siphonal canal too, but differ by the smooth paucispiral protoconch, the higher number of spiral cords and by radular morphology (central tooth with broader base, lateral teeth with 4-8 cusps).

Species accommodated in the buccinid deep-water genus *Manaria* Smith, 1906 (type species *M. thurstoni* Smith, 1906 by original description, northern Indian Ocean, Buccinidae) may have a similar shape but differ by the smooth paucispiral protoconch, by a usually higher number of primary spiral cords but lower number of secondary spiral cords, by the weaker axial ribs and by radular morphology (which is buccinid, central tooth broader, lateral tooth with 2 cusps). For more details on this genus we refer to Bouchet & Warén, 1986.

Species of the turbinellid genus *Metzgeria* Norman, 1879 (new name for *Meyeria* Dunker & Metzger, 1874, type species *Lathyrus albellus* Dunker & Metzger, 1874 by monotypy, junior synonym of *Latirus albus* Jeffreys in Wyville-Thompson, 1873, northern Atlantic, Turbinellidae) differ by the presence of columellar folds and by radular morphology (lateral teeth with one cusp). *Meyeria decorata* Locard, 1897 has been assigned to Turbinellidae (Cernohorsky, 1973: 125), until Bouchet & Warén (1986: 161, 254) have recognized the species as a junior synonym of *Fusinus amiantus* (Dall, 1889).

Etymology. *Amiantofusus* gen. nov. is named after the type species: *Fusus amiantus* Dall, 1889.

Amiantofusus amiantus (Dall, 1889) comb. nov.

Figs 1-6, 14-16, 24-25

Fusus amiantus Dall, 1889: 169, pl. 15, fig. 11.

Type locality. Off Havana, Morro Light, Cuba, U.S. Coast Survey, stn 2, 23°14'00"N, 82°25'00"W, 1480 m.

Synonyms. *Fusus grimaldii* Dautzenberg & Fischer, 1896: 434, pl. 18, figs 10-11. Type locality: off Madeira, MONACO stn 213, 39°23'N, 31°25'W, 1384 m.

Fusus grimaldii var. *major* Locard, 1897: 330.

Meyeria decorata Locard, 1897: 337, pl. 16, figs 31-34. Type locality: off Madeira, TALISMAN 1883 dr 127, 38°38'N, 28°21'W, 1257 m.

Meyeria decorata var. *ecaudata* Locard, 1897: 338.

References. *Fusinus amiantus* (Dall, 1889), Bouchet & Warén, 1985: 161, figs 377-378, 386.

Fusinus amiantus (Dall, 1889), Gofas, 2000: 10, figs E-F.

Fusinus ? *amiantus* (Dall, 1889), Hadorn & Rogers, 2000: 9, figs 5-6.

Material examined. Holotype of *Fusus amiantus* Dall, 1889, in USNM 508726.

Type material of *Meyeria decorata* Locard, 1897, off Madeira, TALISMAN 1883 stn dr 127, 38°38'N, 28°21'W, 1257 m, 2 syntypes, MNHN 6765. - TALISMAN 1883 stn dr 126, 38°37'N, 28°21'W, 1258 m, 1 syntype, MNHN 6764.

TALISMAN 1883, off Azores (as *F. grimaldii*): dr 122, 1440 m, 4 lv. - dr 127, 1258 m, 10 lv, 3 dd, MNHN.

Princesse Alice (as *F. grimaldii*), dr 74, 1360 m, 1 lv (det. *F. grimaldii* by H. Fischer, coll. H. Fischer) (not figured by Tryon), MNHN. - Stn 719, 39°11'N, 32°44' 30"W, 1600 m, 1dd (coll. S.A.S. le Prince de Monaco), MNHN.

Jean Charcot-BIACORES 1971, stn BI66, 38°34'N, 28°19'W, 1225-1260 m, 1 lv [figured by Bouchet & Warén (1985: 162, figs 378, 386)], 1 dd, MNHN. - Stn DP48, 37°44'N, 29°03'W, 430-465 m, 1 lv, MNHN. - Stn CHG179, 38°05,5'N, 25°46'W, 1590-1665 m, 1 lv, MNHN.

SEAMOUNT 2, stn DW180, 30°04,10'N, 28°45,10'W, 1575 m, 1 alc (dissected for anatomy), MNHN.

Distribution. *Amiantofusus amiantus* is an amfi-Atlantic species. In the West Atlantic known from the northern Caribbean, off Cuba (Dall, 1889: 169). In the East Atlantic known, not from the continental shelf, but on the seamounts and slopes of the Azores and Madeira (Bouchet & Warén, 1985: 161) and on Meteor, Irving and Plato Bank (Gofas, 2000: 10).

Remarks. *Amiantofusus amiantus* is characterized by the fusinid shape but with short siphonal canal, in combination with a multispiral protoconch and the presence of peculiar semilunar axial ribs on the lower protoconch whorl.

Amiantofusus amiantus displays considerable variability in shape. Subadult specimens have a smaller aperture in combination with a longer siphonal canal. Adult specimens have a wider outer lip and shorter siphonal canal, the shape of the base looks more rounded. The spiral and axial sculpture is rather constant.

Fusinus bocagei (P. Fischer, 1882) differs by the protoconch (finer and lesser curved axial ribs, broader interspaces, the absence of subsutural spiral cords), the longer siphonal canal, the absence of a thick lip and the higher number of primary spiral cords (3 on the spire, up to 9 on the body whorl).

Latirus rugosissimus (Locard, 1897), an East Atlantic species with almost identical protoconch, differs considerably in teleoconch morphology.
For differences with *Amiantofusus pacificus* sp. nov. we refer to the comparison under that species.

Amiantofusus pacificus sp. nov.

Figs 7-13, 17-23, 28-30, 34-45, 66-69

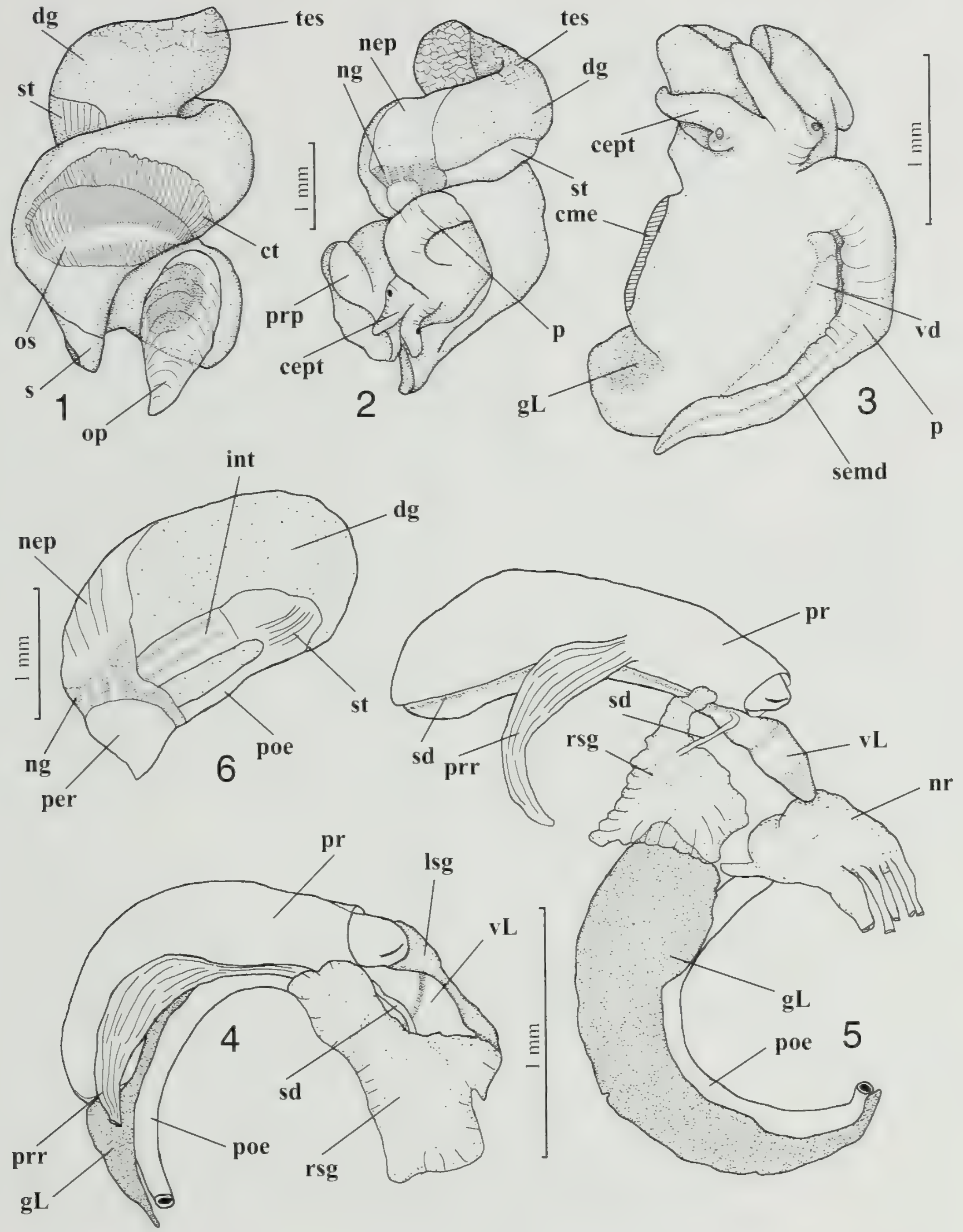
Type material. Holotype (26.3 mm) (SMIB 8, stn DW152), MNHN 7039. Paratypes 1-4 (same locality), MNHN 7064. Paratypes 5-8 (BERYX 11, stn DW10) 3 MNHN 7040, 1 YIC; Paratypes 9-10 (NORFOLK stn DW1691) 1 KF nr 5184, 1 RH.

Type locality. Norfolk Ridge, Sponge Bank, Mount B, SMIB 8, stn DW152, 24°54'S, 168°22'E, 514-530 m.

Material examined. East coast of Taiwan: TAIWAN 2000, stn DW56, 24°29'08"N, 122°12'06"E, 438 m, 1 dd.
North Fiji Basin, Vitiaz Zone: MUSORSTOM 7, stn DW539 (Combe Bank), 12°27'S, 177°27'W, 700 m, 1 dd. - Stn DW540 (Combe Bank), 12°27'S, 177°28'W, 600 m, 1 dd juv. - Stn DW573 (Waterwitch Bank), 12°31'S, 176°52'W, 364 m, 1 dd. - Stn DW576 (Waterwitch Bank), 12°31'S, 176°53'W, 680-685 m, 1 dd. - Stn DW597 (Field Bank), 12°31'S, 174°19'W, 469-475 m, 1 lv. - Stn DW625 (Bayonnaise Bank), 11°52'S, 179°34'W, 425-430 m, 2 dd, 1 lv juv. - Stn CP629 (Bayonnaise Bank), 11°54'S, 179°32'W, 400-420 m, 1 lv.
Northern New Caledonia, off Entrecasteaux Reefs: BATHUS 4, stn CP921, 18°47'S, 163°17'E, 610-613 m, 1 lv. - Stn CP922, 18°48'S, 163°19'E, 600 m, 1 dd.
MUSORSTOM 4, stn DW159, 18°46'S, 163°16'E, 585 m, 1 lv. - Stn CP199, 18°50'S, 163°14'E, 595 m, 1 dd.
Southern Coral Sea, Nova Bank: MUSORSTOM 5, stn DW313, 22°24'S, 159°33'E, 780-930 m, 2 dd (1 juv).
Southern New Caledonia, off Noumea: BATHUS 2, stn CP743, 22°36'S, 166°26'E, 713-950 m, 1 dd.
Southern New Caledonia Slope: BIOCAL, stn DW36, 23°09'S, 167°11'E, 650-680 m, 1 dd. - Stn DW51, 23°05'S, 167°45'E, 680-700 m, 1 dd, 2 lv juv.
Southern New Caledonia, Norfolk Ridge: BIOCAL, stn DW66 (Sponge Bank), 24°55'S, 168°22'E, 505-515 m, 1 lv juv, 2 dd.
CHALCAL 2, stn CC1 (Sponge Bank), 24°55'S, 168°22'E, 500 m, 1 lv. - Stn CC2 (Sponge Bank), 24°55'S, 168°21'E, 500 m, 1 dd. - Stn DW72 (Sponge Bank), 24°55'S, 168°22'E, 527 m, 3 lv, 6 dd (2 juv).
SMIB 3, stn DW2 (Sponge Bank), 24°53'S, 168°22'E, 530-537 m, 1 dd. - Stn DW3 (Sponge Bank), 24°55'S, 168°22'E, 513 m, 2 dd. - Stn DW5 (Sponge Bank), 24°55'S, 168°22'E, 502-512 m, 2 dd. - Stn DW6 (Sponge Bank), 24°56'S, 168°21'E, 505 m, 1 dd. - Stn DW7 (Sponge Bank), 24°55'S, 168°21'E, 505 m, 4 dd.
SMIB 4, stn DW34 (Sponge Bank), 24°55'S, 168°22'E, 510-515 m, 1 lv.
BERYX 11, stn DW09 (Sponge Bank), 24°52'S, 168°22'E, 635-680 m, 1 lv juv, 2 dd. - Stn DW10 (Sponge Bank), 24°53'S, 168°21'E, 565-600 m, 3 lv, 1 dd. - Stn CP60 (Aztèque Bank), 23°19'S, 168°00'E, 580-600 m, 1 lv.
BATHUS 3, stn DW807 (Jumeau West Bank), 23°40'S, 167°59'E, 420-435 m, 1 dd. - Stn DW809 (Jumeau West Bank), 23°39'S, 167°59'E, 650-730 m, 5 lv (2 juv.) (3 alc, anatomy), 8 dd (6 juv). - Stn DW810 (Jumeau West Bank), 23°40'S, 167°59'E, 850-900 m, 1 dd juv. - Stn DW824 (Aztèque Bank), 23°19'S, 168°00'E, 601-608 m, 1 lv juv, 1 dd.
SMIB 8, stn DW146-147 (Sponge Bank, Mount B), 24°55'S, 168°22'E, 508-532 m, 1 lv juv. - Stn DW149 (Sponge Bank, Mount B), 24°55'S, 168°22'E, 508-510 m, 4 dd. - Stn DW150, 24°54'S, 168°22'E, 519-530 m, 2 lv (1 juv), 3 dd (1 juv). - Stn DW152 (Sponge Bank, Mount B), 24°54'S, 168°22'E, 514-530 m, 2 lv, 8 dd (3 juv).
NORFOLK 1, stn DW1688 (Sponge Bank), 24°56'S, 168°22'E, 533-545 m, 1 lv, 2 dd (1 juv). - Stn DW1690 (Sponge Bank), 24°54'S, 168°22'E, 514-515 m, 1 dd. - Stn DW1691 (Sponge Bank), 24°54'S, 168°22'E, 509-513 m, 2 lv. - Stn DW1692 (Sponge Bank), 24°56'S, 168°21'E, 507-967 m, 3 dd (1 juv). - Stn DW1696 (Introuvable Bank), 24°39'S, 168°39'E, 780-806 m, 1 lv. - Stn DW1697 (Introuvable Bank), 24°39'S, 168°38'E, 569-616 m, 1 lv.
NORFOLK 2, stn DW2046 (Jumeau West Bank), 23°44'S, 168°01'E, 785-810 m, 1 lv juv, 1 dd juv. - Stn DW2060 (Introuvable Bank), 24°40'S, 168°38'E, 582-600 m, 3 dd. - Stn DW2065 (Athos Bank), 25°16'S, 168°56'E, 750-800 m, 1 lv, 11 dd (3 juv). - Stn DW2068 (Porthos Bank), 25°20'S, 168°57'E, 680-980 m, 7 dd (4 juv). - Stn DW2069 (Porthos Bank), 25°20'S, 168°58'E, 795-852 m, 5 lv, 16 dd (7 juv). - Stn DW2073 (Zorro Bank), 25°24'S, 168°19'E, 609 m, 1 dd juv. - Stn DW2080 (Zorro Bank), 25°20'S, 168°19'E, 764-816 m, 6 lv (3 juv), 9 dd (4 juv). - Stn DW2084 (Sponge Bank), 24°52'S, 168°22'E, 586-730 m, 4 dd. - Stn DW2086 (Sponge Bank), 24°56'S, 168°22'E, 707-777 m, 7 dd (3 juv).

Figures 1-6

1-6. *Amiantofusus amiantus* (Dall, 1889) comb. nov., Meteor Bank, SEAMOUNT 2, stn DW180, 30°04,10'N, 28°45,10'W, 1575 m, MNHN;
1-2. body; **3.** head with penis; **4-6.** alimentary system.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Southern New Caledonia, Loyalty Ridge: BIOCAL, stn DW33, 23°10'S, 167°10'E, 675-680 m, 1 lv.
BIOGEOCAL, stn CP232, 21°34'S, 166°27'E, 760-790 m, 2 dd (1 juv).
BATHUS 3, stn DW1 (Sponge Bank, Mount B), 24°56'S, 168°22'E, 520 m, 1 dd. - Stn DW7 (Sponge Bank, Mount B), 24°55'S, 168°21'E, 505 m, 1 dd. - Stn DW776 (Mount K), 24°44'S, 170°08'E, 770-830 m, 1 lv, 17 dd (12 juv). - Stn DW778 (Mount K), 24°43'S, 170°07'E, 750-760 m, 2 lv (1 juv), 4 dd (3 juv). - Stn DW780, 24°46'S, 170°07'E, 850-855 m, 1 dd juv. - Stn DW781, 23°54'S, 169°46'E (Mount J), 625-640 m, 2 dd juv. - Stn DW786, 23°54'S, 168°49'E, 699-715 m, 37 dd (19 juv). - Stn DW787, 23°54'S, 169°48'E (Mount K), 695-702 m, 1 lv, 2 dd (1 juv). - Stn DW789, 23°51'S, 169°49'E, 671-674 m, 5 dd (3 juv). - Stn DW790, 23°49'S, 169°48'E, 685-715 m, 15 lv (8 juv), 86 dd (44 juv). - Stn DW793, 23°47'S, 169°49'E, 731-751 m, 3 dd juv. - Stn DW794, 23°48'S, 169°49'E, 751-755 m, 4 lv juv, 24 dd (8 juv). - Stn DW795, 23°47'S, 169°49'E, 735-755 m, 2 dd. - Stn DW800, 23°35'S, 169°37'E (Mount D), 655 m, 1 lv juv.
MUSORSTOM 6, stn DW438, 20°23'S, 166°20'E, 780 m, 3 dd (2 juv). - Stn DW468, 21°06'S, 167°33'E, 600 m, 1 lv. - Stn DW488, 20°49'S, 167°06'E, 800 m, 1 dd.
Vanuatu Islands, Gemini Mountain: VOLSMAR, stn DW55, 20°59'S, 170°02'E, 710 m, 7 dd (6 juv).
Tonga Islands: BORDAU 2, stn DW1632, 22°01'S, 175°42'W, 613-618 m, 1 lv.

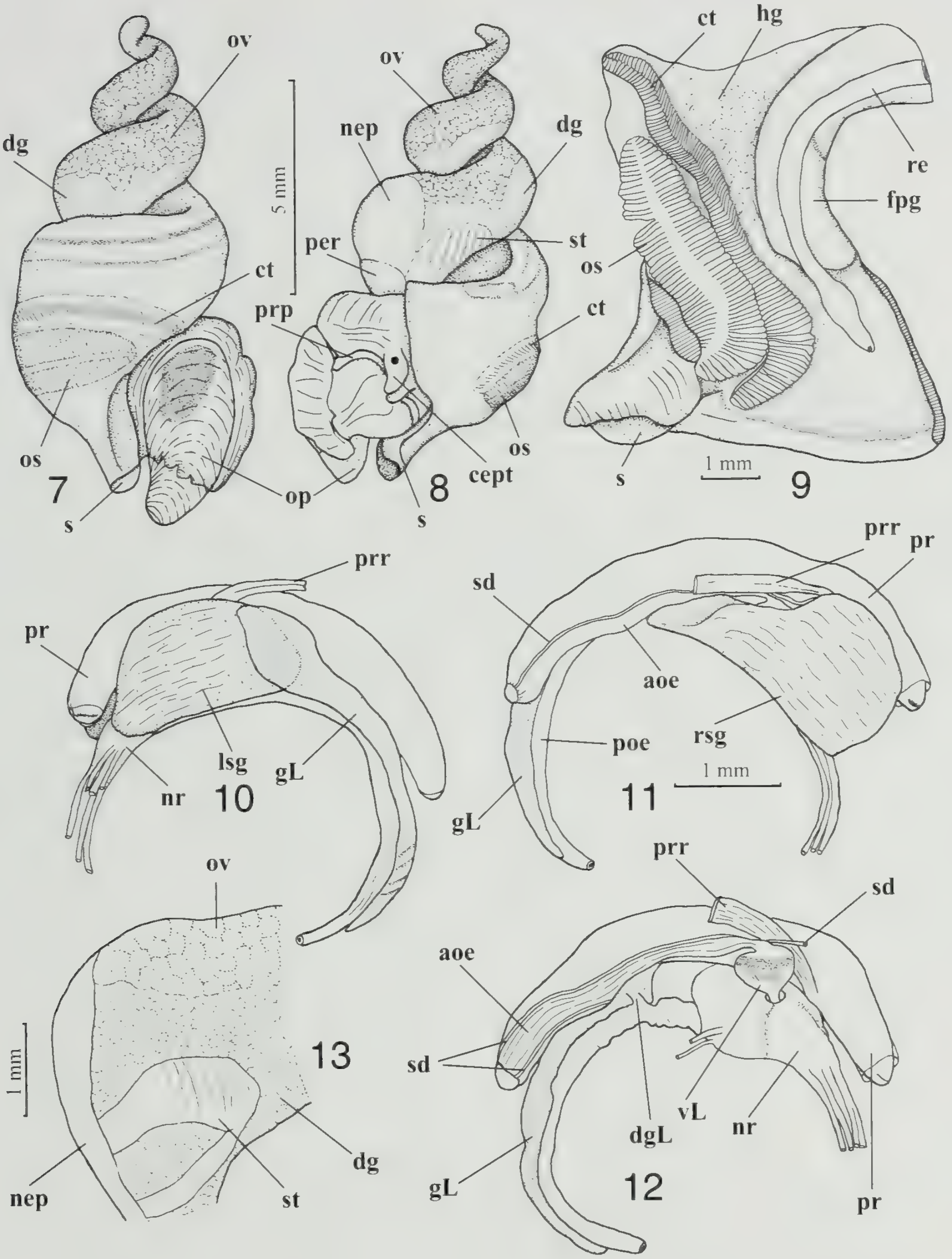
Distribution and habitat. *Amiantofusus pacificus* is known from Taiwan in the north, the Vitiaz Zone of north Fiji Basin, the Coral Sea (Nova Bank), off New Caledonia (Norfolk Ridge, Loyalty Ridge), off Vanuatu and off Tonga. Bathymetric range alive in 420-795 m, empty shells at 364-850 m.
Living on rubble bottoms. Most specimens collected alive are juvenile.

Description. Shell of medium size (about 26 mm, occasionally up to 43.6 mm), fusiform, slender with high spire and short siphonal canal. Axial sculpture dominant on all whorls. Suture rather deep. Colour ranging from white to orange.
Protoconch multispiral consisting of about 3 whorls, shape conical, colour yellow or pale orange. Diameter 0.9 mm. Tip eroded. First whorls smooth, glossy. Last 1 to 1 1/4 whorl covered with numerous axial riblets, at first fine, slightly curved, dense, gradually becoming broader, stronger and more curved at abapical end. Ornamented with suprasutural spiral cord.
Teleoconch consisting of 7 1/4 convex whorls.
First teleoconch whorl with 2 sharp primary spiral cords and 1 additional, fine, subsutural cord. Second whorl with a fourth spiral cord partly concealed under lower suture. Third whorl with 3 primary cords, adapical one finer, and 1 additional, fine, subsutural cord. Interspaces broad, ornamented with many fine, axial growth lines. Primary spiral cords gradually becoming lower, interspaces with additional fine secondary spiral cords. Penultimate whorl with 4 strong, convex primary spiral cords, interspaces with 3-5 fine secondary spiral cords, in addition 4 or 5 fine subsutural spiral cords.
Body whorl with 9 or 10 primary spiral cords, 3-5, occasionally 6, secondary spiral cords between each adapical pair of primary cords. 1-4 fine secondary spiral cords between each abapical pair of primary cords. Siphonal canal with some broad spiral cords, occasionally alternating strong and fine.
All whorls with 8 or 9 sharp axial ribs, running from suture to suture. Interspaces twice as broad.
Aperture semi-ovate. Outer lip with 8 internal lirae and thick labral varix. Columella with about 9 knobs, 5 abapical and 2 adapical ones strong. Callus thin. Siphonal canal short, broad, open.
Periostracum thin, rather velvety, grey-brown.
Radula (Figs 17, 22-23) with small, narrow, tricuspid central tooth with elongate base. Lateral teeth broad, slightly curved, with 4 major cusps accompagnied by a small knob or cusp at both ends.
Operculum (Figs 7 – **op**; 18-21) completely transparent, light yellow, very thin, elongate-oval, with terminal nucleus, nucleus eroded. Growth lines very thin, inconspicuous, and numerous. Operculum attached along short oval area (about 1/2 of operculum length) to opercular pad.

Anatomy of *A. pacificus* sp. nov., a female specimen (spire length 21.0 mm, body whorl length 12.0 mm, apertural length 10.2 mm, siphonal width 8.2 mm) from Jumeau West Bank, Loyalty Ridge (southern New Caledonia), BATHUS 3, stn DW809.
Body light yellow when preserved, consisting of about 3 1/2 whorls, mantle cavity spanning about 3/4 whorl, digestive gland about 2 whorls, ovary about 3 upper whorls (Figs 7-8). Although the body was deeply retracted into the shell, the upper 6 whorls, 3 1/4 of which are teleoconch whorls, were not occupied by the body, but filled with mucus. Nephridium (Fig. 8 – **nep**) narrow spanning about 1/5 whorl, preservation precludes studies of internal anatomy. Nephridial

Figures 7-13

7-13. *Amiantofusus pacificus* sp. nov., Jumeau West Bank, Norfolk Ridge, BATHUS 3, stn DW809, 23°39'S, 167°59'E, 650-730 m, MNHN;
7-8. body; **9.** mantle cavity; **10-13.** alimentary system.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gland narrow, with transparent walls. Lobes of the digestive gland fuse without distinct border. The gland occupies the ventral part of the upper whorls of visceral mass, the border line between digestive gland and the ovary is wavy (Figs 7-8).

Foot thick, with subrectangular sole, gradually narrowing posteriorly. Propodium narrow, separated from metapodium by narrow and shallow propodial cleft. Head small, poorly differentiated from the foot, tentacles long, but folded during fixation, conical, with distinct light-brown eyes at tentacles bases (Fig. 8 – **cept**).

Mantle cavity (Fig. 9). Mantle cavity long, its length about 1.5 the width, edge even and thickened when animal is contracted. Mantle wall thin, osphradium, ctenidium, pallial gonoduct, and hypobranchial gland visible by transparency. Siphon with thick and contracted walls, short, very slightly extending beyond mantle edge. Ctenidium (Fig. 9 – **ct**) large, but narrow, occupying about 0.9 of mantle length, consisting of simple tall triangular lamellae. Osphradium twice as wide as ctenidium and 0.6 of its length (Fig. 9 – **os**), asymmetrical, with broad axis. Its lamellae on the right side are wider than on the left side, especially in the anterior part in proximity to the mantle edge. Hypobranchial gland indistinct, narrow, lacking folds, covered with thick mucus layer (Fig. 9 – **hg**). Rectum narrow, thin-walled, of similar diameter along its length, without terminal papilla. Rectal gland absent.

Alimentary system (Figs 10-13). Proboscis long in contracted state (about 4.5 mm, or 0.44 AL), with smooth walls, occupying entire rhynchocoel length, rhynchodeum semitransparent. Proboscis narrow, length about 8 1/2 diameter. Mouth opening broad compared to proboscis diameter, in the shape of dorso-ventrally compressed narrow slit. Proboscis retractors very thin, attached to the rhynchodaeum laterally in its anterior third (Figs 10-12 – **prr**). The retractor attached to the right side of rhynchodaeum is larger, consists of single muscle, while those, attached to the left side are thinner and consists of few separate muscle fibers.

Oesophagus leaving proboscis posteriorly is broad but flattened, forming a rather long loop. Valve of Leiblein large (Fig. 12 – **vL**), compared to oesophagus diameter, pyriform, the ciliar conical valve is visible through transparency of the walls of the valve. Oesophagus narrow immediately posterior to the valve and passing through the nerve ring. Circumoesophageal nerve ring comparatively large (Fig. 12 – **nr**), concentrated, covered with thick connective-tissue layer. Mid-oesophagus after passing through the nerve ring slightly widens and received short but broad duct of the gland of Leiblein (Fig. 12 – **dgL**). Posterior esophagus (posterior to the opening of the duct of the gland of Leiblein) slightly widens, but is very thin - walled, nearly transparent. Gland of Leiblein long, colorless in preserved condition, tubular, uncoiled, tapering posteriorly, very thin-walled, semi-transparent (Figs 10-12 – **gL**).

Salivary glands very large situated on both sides of anterior part of rhynchodaeum and the circumoesophageal nerve ring, completely covering the latter· (Figs 10-11 – **lsg, rsg**). Salivary ducts leaving the glands and fused with the walls of the oesophagus immediately anterior to the valve of Leiblein (Figs 11, 12 – **sd**). Accessory salivary glands absent. Stomach small, broadly U-shaped, without posterior mixing area (Fig. 13 – **st**). Posterior oesophagus opens into the stomach vetro-posteriorly. Due to fixation it was impossible to study stomach anatomy.

The two examined species, *A. amiantus* and *A. pacificus* sp. nov. are very similar to each other both in radulae and anatomy. The only difference that can be mentioned is that *A. amiantus* has clearly a single proboscis retractor, attached nearly ventrally to the rhynchodaeum, while *A. pacificus* sp. nov. has a similar retractor, but attached more laterally on the right side, while there are additional thin muscle fibers attached to the rhynchodaeum on the left side and probably also functioning as retractors.

Comparison. *Amiantofusus pacificus* sp. nov. exhibits a strong degree of, mostly geographic indicated, variability. The multispiral protoconch indicates a planktotrophic development and a wide distribution. This is reflected in the geographic range indeed (from Taiwan, via North Fiji Basin to northern and southern New Caledonia, southern Coral Sea, Vanuatu and Tonga). The bathymetric range is rather narrow (420-795 m). The populations are separated by deeper water, causing a certain geographic isolation which is well reflected by the differences in shell morphology. A number of intermediates are collected (between most of the forms), evidence that these populations are not fully separated entities. Therefore we consider them merely as a variant, calling them a form. Here we use “form" in the common used sense, instead of the correct expression for "form", which is "phenon" (Mayr & Ashlock, 1991: 20).

Form **A**, the “Norfolk Ridge form” (fig. 34-35), is rather small and usually has a slightly larger siphonal canal, the colour ranges from pale orange to bright orange.

This form lives on the southwestern part of Norfolk Ridge at 500-780 m. Empty shells between 435 and 850 m.

Form **B**, the “Loyalty Ridge form” (figs 36-37), is smaller and paler, has sharper knobs on the axial ribs, has usually a higher number of secondary spiral cords (4 or 5).

This form lives on Loyalty Ridge and has a slightly deeper bathymetric range at 680-770 m. Empty shells between 505 and 850 m.

Form **C**, the "solid form" (figs 38-39), has a slightly thicker shell, giving the specimens a solid appearance. The primary spiral cords and the axial sculpture gradually become weaker on the penultimate whorl and the body whorl has a smooth appearance. The colour is pale orange to white.

This form lives on southern New Caledonia slope and the northern part of Norfolk Ridge (where it is connected and gradually mixing with form A in the south), on the northern part of Loyalty Ridge (where it is connected and gradually mixing with form B) and in the north-western area of the range (southern Coral Sea and off Noumea). Bathymetric range 515-585 m. Empty shells between 500 and 800 m.

Form **D**, the "smooth form" (figs 40-45), has a body whorl without any axial sculpture. The specimens from northern New Caledonia (off Entrecasteaux Reef) are small, the specimens from southern New Caledonia and off Tonga usually are exceptionally large for the species. Bathymetric range 613-680 m. Empty shells between 600 and 680 m. A specimen of this form is found together with "form A" at BATHUS 3, stn DW809.

The above mentioned difference in body whorl sculpture is not sufficient to describe this shell as a distinct species.

Form **E**, the "Vitiaz form" (figs 68-69), has a thick and solid shell with big axial ribs and strong secondary spiral cords, in combination with a weaker subsutural cord. The protoconch is slightly shorter (1.0 mm high, diameter 0.9 mm), usually with many, slightly straighter axial riblets. This minute difference in protoconch morphology is not sufficient to describe this shell as a distinct species.

This form lives on the banks of the Vitiaz Zone in north Fiji Basin. The single specimen from off Taiwan (TAIWAN 2000, stn DW56) is much similar.

Form **F**, represented by a single specimen, has a slightly larger protoconch, and the primary cords appear earlier and are well visible (the third spiral cord already on the first whorl, the fourth spiral cords on the third whorl).

This specimen originates from Introuvable Bank (NORFOLK 1, stn DW1696) on the eastern part of Norfolk Ridge.

Amiantofusus amiantus comb. nov. is similar in sculpture but differs in having a higher spire and a more knobbed sculpture.

"Fusus" thielei Schepman, 1911 is similar in sculpture and may look similar to specimens from northern Fiji Basin, but differs in having a broader shape and a subsutural concavity which is slightly deeper. The spiral sculpture is slightly sharper.

Etymology. Named after the Pacific Ocean, conjuring up the contrast with the Atlantic Ocean were the type species *Amiantofusus amiantus* (Dall, 1889) is living.

Amiantofusus gloriabundus sp. nov.

Figs 46-47

Type material. Holotype (34.9 mm) (MUSORSTOM 7, stn DW598), MNHN 7063. Paratypes 1-2 (juvenile) (MUSORSTOM 7, stn DW589), MNHN 7041.

Type locality. North Fiji Basin, Vitiaz Zone, Field Bank, MUSORSTOM 7, stn DW598, 12°30'S, 174°18'W, 702-708 m.

Material examined. North Fiji Basin, Field Bank: MUSORSTOM 7, stn DW589, 12°16'S, 174°41'W, 400,m, 2 lv juv (paratypes 1-2). - Stn DW594, 12°31'S, 174°20'W, 495-505,m, 1 dd juv. - Stn DW598, 12°30'S, 174°18'W, 702-708 m, 1 dd (holotype).

Distribution and habitat. *A. gloriabundus* sp. nov. is only known from the Field Bank (Vitiaz Zone north of Fiji Basin). Alive specimens in 400 m. Empty shells in 505-702 m.

A. pacificus sp. nov. was currently not collected together with *A. gloriabundus* sp. nov., although they were found close together (MUSORSTOM 7, stn DW597, respectively stn DW594).

Description. Shell large (up to 34.9 mm), semi-transparent, fusiform, slender with high spire and short siphonal canal. White. Sculpture fine, spire with reticulate appearance.

Protoconch white, multispiral, with 3 1/3 to 3 1/2 whorls, diameter 0.9 mm. First whorls smooth, glossy. Last 1 to 1 1/3 whorl covered with numerous rather straight (or occasionally curved at abapical end) axial riblets and ornamented with suprasutural spiral cord, last 1/6 part becoming slightly narrower with stronger axial riblets.

Teleoconch consisting of 8 3/4 convex whorls (holotype).

First teleoconch whorl with 3 primary spiral cords, 2 adapical ones strong, abapical one weaker but becoming as strong as others on fourth whorl. Interspaces broad, ornamented with many fine, well pronounced axial growth lines. An additional fourth primary spiral cord appears subsuturaly from fourth whorl on. Secondary spiral cords visible from third whorl on, 1 between each pair of primary cords, their number increasing to 3 on body whorl. Body whorl with 10 primary spiral cords, 3 weak secondary spiral cords between each pair of primary, and a number of broad, flat cords on siphonal canal.

First whorls with 10 narrow axial ribs, running from suture to suture. Interspaces broad. Penultimate whorl with 17 weak axial ribs, body whorl with 20 ribs.

Aperture ovate, outer lip with thick varix, columella smooth, callus thin. Siphonal canal short.

Operculum, periostracum and radula unknown.

Comparison. *Amiantofusus gloriabundus* sp. nov. is characterized by the large semi-transparent shell with a reticulate appearance on the spire and a large number of weak axial ribs on the two last whorls.

Amiantofusus pacificus sp. nov. form E, the "Vitiaz form", which is also found at Field Bank (North Fiji Basin), differs by the more pronounced spiral sculpture with 3 primary spiral cords (instead of 4), stronger secondary spiral cords, and a lower number of axial ribs.

All other *Amiantofusus* species described in this paper differ by the lower number of axial ribs on the penultimate and body whorl.

Fusus thielei Schepman, 1911 differs in having a strongly twisted columella, a lower number of axial ribs and a longer siphonal canal.

Etymology. *Amiantofusus gloriabundus* sp. nov. is named after the Latin expression *gloriabundus* (adjective), meaning "flaunty", to express the exceptional beauty of this shell.

Amiantofusus species 1

Material examined. North Fiji Basin, eastern Vitiaz Zone: MUSORSTOM 7, stn DW635, 13°49'S, 179°56'E, 700-715 m, 1 lv.

Comparison. The single specimen is similar to *A. gloriabundus* sp. nov. in colour, spiral sculpture and by the fine incremental lines but differs by the slender shape and lower number of axial ribs.

Amiantofusus pacificus sp. nov. differs by the larger protoconch and by the primary spiral cords which are fewer in number and lesser pronounced.

Amiantofusus sebalis sp. nov.

Figs 54-57

Type material. Holotype (23.6 mm) (BATHUS 1, stn CP661), MNHN 7062. Paratypes 1-9 (same locality), 6 MNHN 7042, 1 YIC, 1 KF nr 5185 and 1 RH.

Type locality. Off eastern New Caledonia, BATHUS 1, stn CP661, 21°05'S, 165°50'E, 960-1100 m.

Material examined. Northern New Caledonia: MUSORSTOM 4, stn DW161, 18°39'S, 163°11'E, 550 m, 1 dd.

Coral Sea, Mellish Reef: CORAIL 2, stn DW172, 18°26'S, 155°12'E, 1100 m, 1 dd.

Southern Coral Sea, Nova Bank: MUSORSTOM 5, stn DW313, 22°24'S, 159°33'E, 780-930 m, 2 dd. - **Coriolis Bank:** MUSORSTOM 5, stn DC321, 22°20'S, 158°02'E, 1000 m, 12 dd. - Stn DW322, 21°29'S, 158°00'E, 975 m, 11 dd. - Stn CP323, 21°19'S, 157°58'E, 970 m, 1 dd. - Stn CP324, 21°15'S, 157°51'E, 970 m, 2 dd. - **Chesterfield Plateau**: MUSORSTOM 5, stn DW328, 20°23'S, 158°44'E, 340-355 m, 1 dd.

Eastern New Caledonia, Loyalty Basin: BATHUS 1, stn CP660, 21°11'S, 165°53'E, 786-800 m, 5 dd. - Stn CP661, 21°05'S, 165°50'E, 960-1100 m, 28 dd (5 juv) (holotype and paratypes 1-9). - HALIPRO 1, stn C858, 21°42'S, 166°41'E, 1000-1120 m, 1 dd. - BIOGEOCAL, stn CP232, 21°34'S, 166°27'E, 760-790 m, 5 dd. - BIOCAL, stn CP75, 22°19'S, 167°23'E, 825-860 m, 1 dd.

Loyalty Islands, off Ouvea: BIOCAL, stn DW80, 20°32'S, 166°48'E, 900-980 m, 1 dd, 1 lv.

Vanuatu: MUSORSTOM 8, stn CP956, 20°33'S, 169°36'E, 1175-1210 m, 1 dd. - Stn CP987, 19°23'S, 169°35'E, 1040-1050 m, 1 dd juv. - Stn CP990, 18°52'S, 168°51'E, 980-990 m, 1 dd. - Stn CP991, 18°51'S, 168°52'E, 910-936 m, 1 dd. - Stn CP1008, 18°53'S, 168°53'E, 919-1000 m, 1 dd. - Stn CP1036, 18°01'S, 168°48'E, 920-950 m, 1 dd. - Stn CP1037, 18°04'S, 168°54'E, 1058-1086 m, 1 dd.

Distribution and habitat. *Amiantofusus sebalis* sp. nov. is known from the Coral Sea (Nova Bank, Mellish Reef, Chesterfield Plateau), eastern New Caledonia (Loyalty Basin) and Vanuatu. Bathymetric range alive in 900-980 m (BIOCAL, stn DW80), empty shells in 355-1175 m.

Amiantofusus sebalis sp. nov. is syntopic with *A. maestratii* sp. nov. in Loyalty Basin (BATHUS 1, stn CP661).

Figures 14-23

14-16. *Amiantofusus amiantus* (Dall, 1889) comb. nov.

14. protoconch, 1100 micrometer, after Bouchet & Warén 1986, fig. 379; **15.** radula, 25 micrometer, after Bouchet & Warén 1986, fig. 386; **16.** radula, scale bar 10 micrometer, Meteor Bank, SEAMOUNT 2, stn DW180, 30°04,10'N, 28°45,10'W, 1575 m, MNHN.

17-23. *Amiantofusus pacificus* sp. nov.

17. radula, scale bar 10 micrometer, Jumeau West Bank, Norfolk Ridge, BATHUS 3, stn DW809, 23°39'S, 167°59'E, 650-730 m, MNHN; **18-19.** "form E", operculum, North Fiji Basin, Field Bank, MUSORSTOM 7, stn DW597, 469-475 m; **20-21.** „form D", operculum, with detail, northern New Caledonia, Entrecasteaux Reefs, BATHUS 4, stn CP921, 610-613 m; **22.** „form D", radula, same locality; **23.** „form E", radula, North Fiji Basin, Field Bank, MUSORSTOM 7, stn DW597, 469-475 m.

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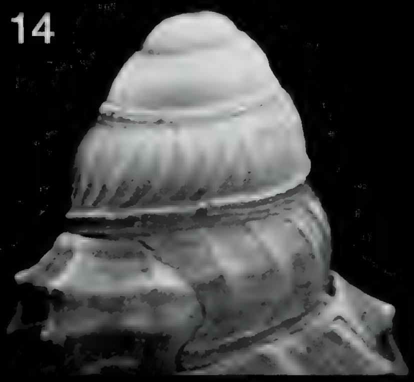

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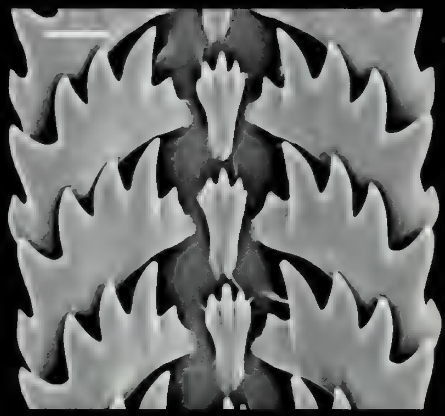

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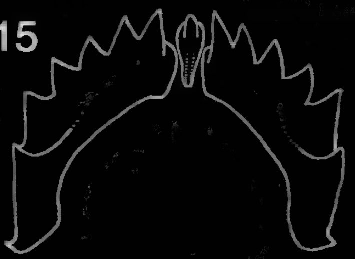

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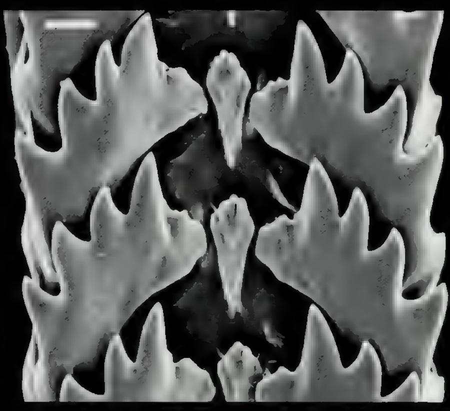

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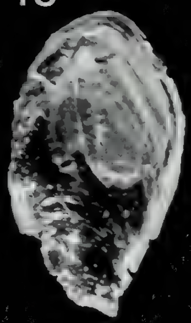

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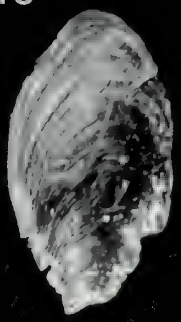

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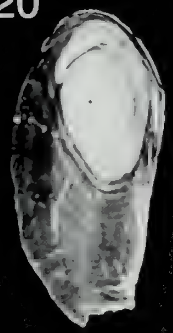

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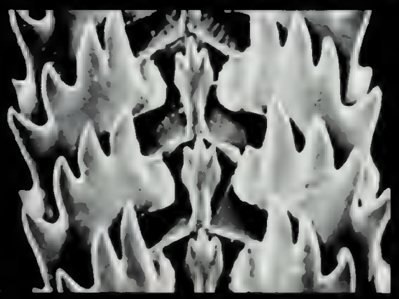

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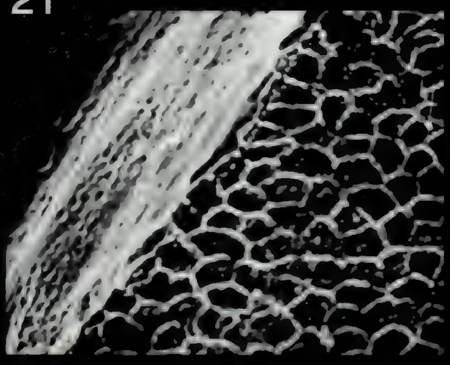

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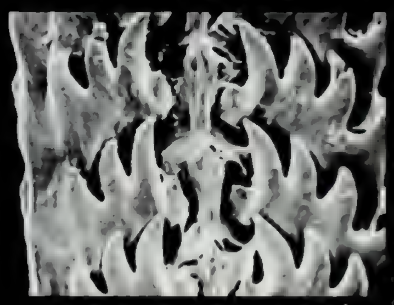


Description. Shell small (up to 26.4 mm, paratype 1), fusiform, slender with high spire and short siphonal canal. Shape of whorls varying from angulate (axial ribs present) to convex (no axial ribs) with weak, concave subsutural slope. White.

Protoconch multispiral, white to yellow-brown, 3 1/3 to 3 1/2 whorls. First whorls smooth, glossy. Last 1 to 1 1/4 whorl covered with numerous axial riblets and ornamented with 1 suprasutural spiral cord, last 1/4 to 1/6 part becoming slightly narrower with stronger axial riblets.

About 7 1/4 teleoconch whorls, all with 2 primary spiral cords, weak or invisible in axial interspaces, more developed on axial ribs, forming weak or strong knobs. Occasionally an additional third primary spiral cord suprasuturally visible. Secondary spiral cords weak or absent, when visible 3 or 4 between primary cords, about 8 on subsutural slope, numerous on body whorl.

First whorls with 10 or 11 axial ribs, running from suture to suture. Interspaces broad. Body whorl with 0-12 ribs.

Aperture semi-ovate, narrow, pinched at both ends. Lip thin. Columella smooth, callus thin. Siphonal canal moderately short.

Periostracum, operculum and radula unknown.

Comparison. *Amiantofusus sebalis* sp. nov. is characterized by its small size, its slender shape with 2 primary spiral cords and fine secondary spiral cords.

Amiantofusus pacificus sp. nov. differs in having a more obvious sculpture, a broader shape with shorter siphonal canal in combination with a larger adult size.

For differences with *A. maestratii* sp. nov., *A. candoris* sp. nov. and *A. borbonica* sp. nov. we refer to the comparison under these species.

Etymology. *Amiantofusus sebalis* sp. nov. is named after the Latin expression *sebalis* (adjective), meaning "made from talcum". Indeed the small shell with a rather dull surface looks rather talcose.

Amiantofusus species 2

Figs 48-49

Material examined. Vanuatu: MUSORSTOM 8, stn CP1125, 15°58'S, 166°38'E, 1160-1220 m, 1 dd.

Comparison. The single specimen is similar to *A. sebalis* sp. nov. in shape and colour but differs by the slightly broader spire, the larger size (8 1/2 teleoconch whorls, 30.5 mm in length) and the more convex whorls. These weak differences are not sufficient to describe this shell before more material is available.

Amiantofusus candoris sp. nov.

Figs 62-63

Type material. Holotype (29.0 mm) (EBISCO, stn CP2648), MNHN 9962. Paratypes 1-2 (same locality), 1 MNHN 9963, 1 RH; paratype 3 (EBISCO, stn CP2652) KF.

Type locality. Chesterfield Islands, south east Fairway, EBISCO, stn CP2648, 21°32'S, 162°30'E, 458-750 m.

Material examined. Southern Coral Sea: Chesterfield Islands, south east Fairway, EBISCO, stn CP2648, 21°32'S, 162°30'E, 458-750 m, 3 dd (holotype and 2 paratypes). - Stn CP2652, 21°24'S, 162°37'E, 1019-1147 m, 1 dd (paratype).

Distribution and habitat. *Amiantofusus candoris* sp. nov. is known from the type material only.

Description. Shell up to 29.0 mm, white, semi-transparent, fusiform, smooth and glossy, slender with high spire and short siphonal canal.

Protoconch yellowish, top decollate in all specimens, about 2 3/4 whorls remaining, diameter 1.0 mm. Whorls eroded, numerous fine axial riblets visible on penultimate whorl. Last 1/2 whorl covered with 10 axial riblets with broad interspaces and ornamented with fine suprasutural spiral cord.

Figures 24-33

24-25. *Amiantofusus amiantus* (Dall, 1889) comb. nov., holotype, 15.6 mm, Cuba, off Havana, Morro Light, U.S. Coast Survey, stn 2, 23°14'00"N, 82°25'00"W, 1480 m, USNM 508726.

26-27. *Fusus thielei* Schepman, 1911, holotype, 46 mm, "Malaya Archipelago", ZMA.

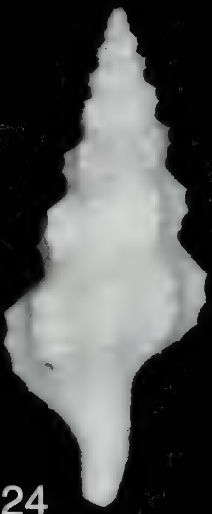
28-30. *Amiantofusus pacificus* sp. nov.

28. protoconch of holotype, „form A", shell 26.3 mm, Norfolk Ridge, Sponge Bank, Mount B, SMIB 8, stn DW152, 24°54'S, 168°22'E, 514-530 m, MNHN 7039; **29.** protoconch of „form B", shell 21.4 mm, Loyalty Ridge, BATHUS 3, stn DW790, 685-715 m, MNHN; **30.** protoconch of "form E", shell 24.9 mm, North Fiji Basin, Field Bank, MUSORSTOM 7, stn DW597, 469-475 m, MNHN.

31-32. *Amiantofusus maestratii* sp. nov.

31. protoconch of paratype, shell 24.3 mm, eastern New Caledonia Slope, BATHUS 1, stn CP661, 960-1100 m, MNHN 7060; **32.** protoconch of holotype, shell 28.9 mm, southern New Caledonia Slope, BIOCAL, stn CP30, 1140 m, MNHN 7043.

33. *Amiantofusus cartilago* sp. nov., protoconch of holotype, 30.8 mm, Madagascar, off Morondava, 500-800 m, MNHN 7045.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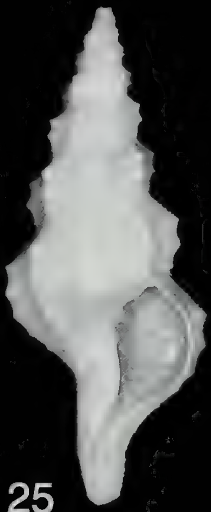
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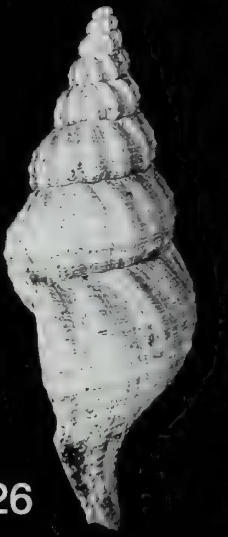
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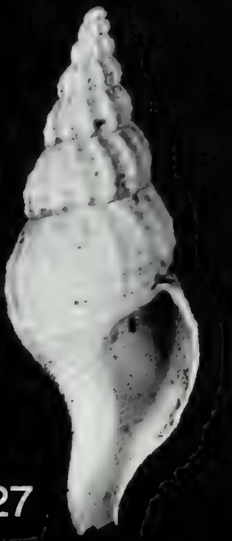
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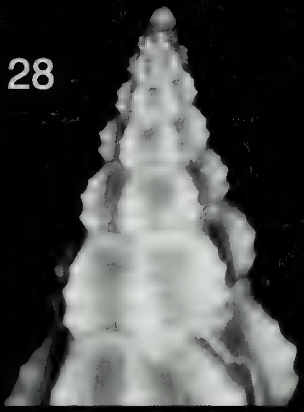
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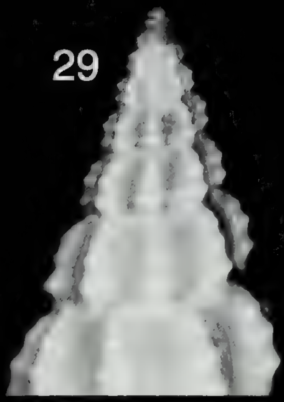
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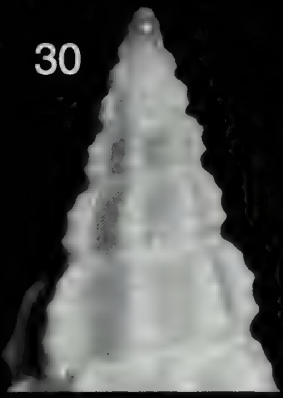
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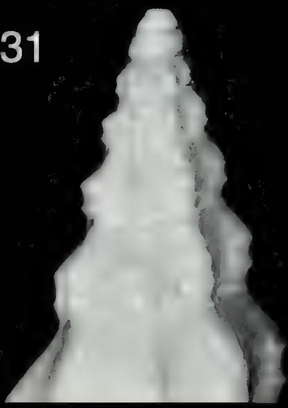
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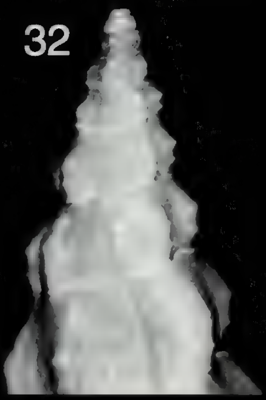
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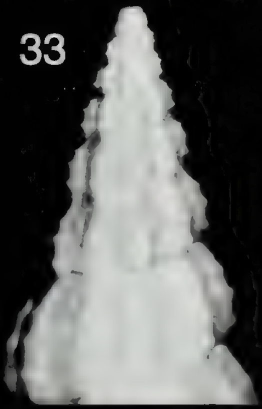
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Teleoconch consisting of 8 3/4 whorls. Upper spire whorls with 2 weak primary spiral cords, weak on axial ribs, almost invisible in interspaces, with broad straight subsutural slope. Abapical spiral cord becoming weaker from fourth whorl on, almost indistinguishable from secondary spiral cords on fifth or sixth whorl. Suture wavy on upper spire whorls, straight on penultimate and body whorl. From third whorl on some weak, smooth secondary spiral cords appearing between both primary spiral cords and on subsutural slope. On later whorls their number increasing up to 25, fine, evenly spaced spiral cords. Body whorl with numerous fine, weak spiral cords.

First whorls with 9 strong axial ribs, running from suture to suture. Interspaces broad. From second whorl on with 8 axial ribs. Axial ribs gradually becoming weaker near both sutures, fifth and sixth whorl with a sharp axial knob on periphery.

Aperture semi-ovate. Outer lip slightly curved outwards. Columella smooth, gently curved. Siphonal canal short, narrow.

Periostracum, radula and operculum unknown.

Comparison. *Amiantofusus candoris* sp. nov. is characterized by the slender, thin, semi-transparent shell with 2 primary spiral cords on the upper whorl of which the abapical one is gradually becoming weaker, and with fine, smooth, evenly spaced secondary spiral cords.

Amiantofusus sebalis sp. nov. is similar in spiral sculpture (2 primary cords on the upper spire whorls, many secondary cords) but differs by the secondary spiral cords which are fine and well distinguishable from the primary cords even where the primary cords are fading, the presence of axial ribs on the penultimate whorl, the (almost) smooth body whorl, the smaller protoconch with narrower last whorl and by the smaller size.

Amiantofusus maestratii sp. nov. differs in having a solid shell, a broader shape with shorter spire, smooth spiral interspaces and a white protoconch with more axial riblets.

Amiantofusus pacificus sp. nov. differs in having a more pronounced spiral sculpture in combination with a broader shape.

Etymology. *Amiantofusus candoris* sp. nov. is named after *candor* or *candoris* (Latin, masculine), meaning "heavy white colour" or “dazzling beauty” which refers to the white colour and the elegant shell.

Amiantofusus maestratii sp. nov.

Figs 31-32, 50-53

Type material. Holotype (28.9 mm) (BIOCAL, stn CP30), MNHN 7043 and 1 paratype (BATHUS 1, stn CP661), MNHN 7060.

Type locality. Southern New Caledonia Slope, BIOCAL, stn CP30, 23°09'S, 166°41'E, 1140 m.

Material examined. Southern New Caledonia Slope: BIOCAL, stn CP30, 23°09'S, 166°41'E, 1140 m, 1 lv (holotype).

Eastern New Caledonia Slope, Loyalty Basin: BATHUS 1, stn CP661, 21°05'S, 165°50'E, 960-1100 m, 1 dd (paratype).

Distribution and habitat. *Amiantofusus maestratii* sp. nov. is known from the type material only. One alive specimen in 1140 m, one empty shell in 960-1100 m.

Amiantofusus maestratii sp. nov. is sympatric with *A. sebalis* sp. nov. in Loyalty Basin (BATHUS 1, stn CP661).

Description. Shell up to 28.9 mm, white to pale yellow-brown, fusiform, rather smooth and glossy, slender with high spire and short siphonal canal.

Protoconch white, top decollate in all specimens, last whorl eroded, about 3 whorls by estimation, diameter 1.2 mm. Last whorl covered with more than 20 axial riblets and ornamented with suprasutural spiral cord.

Teleoconch consisting of 7 or 8 whorls. All whorls with 2 weak primary spiral cords, weak on axial ribs, almost invisible in interspaces, with broad straight subsutural slope. Suture wavy, slightly shouldered, incision rather deep. From fourth whorl on a weak secondary spiral cord appearing between both primary spiral cords. On fifth whorl their number increasing up to 3-5 between primary cords, 2 or 3 additional secondary spiral cords between abapical cord and suture, and numerous on subsutural slope. Body whorl with numerous spiral cords, about 7 primary cords slightly stronger only.

First whorls with 10 strong axial ribs, running from suture to suture. Second whorl to body whorl with 8-10 ribs. Interspaces broad.

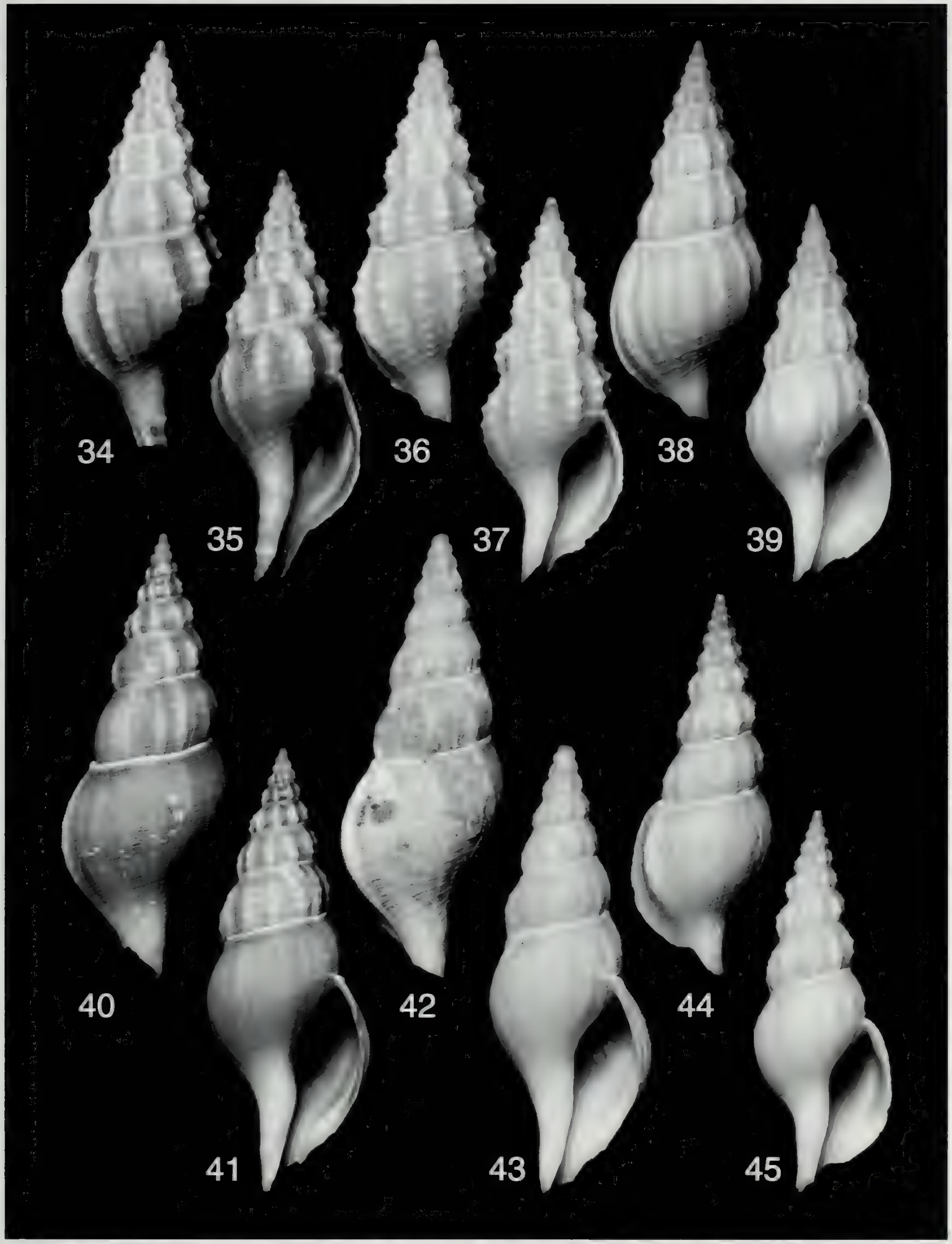
Aperture semi-ovate. Outer lip slightly thickened. Paratype with weak adapical columellar denticle. Siphonal canal short.

Periostracum, radula and operculum unknown.

Figures 34-45

34-45. *Amiantofusus pacificus* sp. nov.

34-35. holotype, "form A", 26.3 mm, Norfolk Ridge, Sponge Bank, Mount B, SMIB 8, stn DW152, 24°54'S, 168°22'E, 514-530 m, MNHN 7039; **36-37.** "form B", 21.4 mm, Loyalty Ridge, BATHUS 3, stn DW790, 685-715 m, MNHN; **38-39.** "form C", 28.7 mm, southern Coral Sea, Nova Bank, MUSORSTOM 5, stn DW313, 780-930 m, MNHN; **40-41.** "form D", 37.5 mm, Tonga, BORDAU 2, stn DW1632, 613-618 m, MNHN; **42-43.** "form D", 43.6 mm, southern New Caledonia slope, BIOCAL, stn DW36, 650-680 m, MNHN; **44-45.** "form D", 30.6 mm, same locality, BIOCAL, stn DW51, 680-700 m, MNHN.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Comparison. *Amiantofusus maestratii* sp. nov. is characterized by the heavy shell with 2 primary spiral cords resulting in a shape dominated by 2 rows of knobs.

Amiantofusus sebalis sp. nov. is similar in spiral sculpture (2 primary cords, many secondary cords) but differs by the smaller size, the thinner shell, the more elongate spire and the (almost) smooth body whorl.

Amiantofusus candoris sp. nov. differs by the thin shell, the slender shape with higher spire, and the presence of secondary spiral cords.

Amiantofusus pacificus sp. nov. differs in having a more pronounced spiral sculpture in combination with a broader shape.

Etymology. *Amiantofusus maestratii* sp. nov. is named to honour Philippe Maestrati (Muséum national d'Histoire naturelle, Paris) for his contributions to malacology, for his important help while studying the material available in MNHN, and for the pleasant hours we spent on Mactan Island, Philippine Islands.

Amiantofusus borbonica sp. nov.

Figs 64-65

Type material. Holotype (12.0 mm, subadult) (MD32, stn DC10), MNHN 7044. Paratype 1-3 (same locality) MNHN 7059; Paratypes 4-5 (MD32, stn DC112) 1 KF nr 5186, 1 RH.

Type locality. Reunion, MD32, stn DC10 (off Pointe des Cascades), 21°13'S, 55°52'E, 930-980 m.

Material examined. Reunion, N/O "Marion Dufresne" MD32, stn DC10 (off Pointe des Cascades), 21°13'S, 55°52'E, 930-980 m, 7 dd juv (holotype and paratypes 1-3). - Stn DC112 (off St. Pauls Bay), 20°53'S, 55°08'E, 740-780 m, 1 dd juv, 1 lv juv (paratypes 4-5).

Distribution and habitat. *Amiantofusus borbonica* sp. nov. is known from west off Reunion (off St. Pauls Bay) and east off Reunion (off Pointe des Cascades). Empty shells in 780-930 m, one alive specimen in 740-780 m.

Description. Shell small (12 mm, subadult), fusiform, slender with high spire and short siphonal canal. Colour white.

Protoconch white, multispiral, 3 1/2 whorls, diameter 0.9 mm. First whorls smooth, glossy. Last 1 to 1 1/4 whorl covered with numerous axial riblets and ornamented with suprasutural spiral cord, last 1/4 to 1/6 part becoming slightly narrower with stronger axial riblets.

Teleoconch consisting of 5 1/2 whorls.

First teleoconch whorl with 2 primary spiral cords, weak in interspaces, strong on axial ribs, forming well developed knobs. From second whorl on an additional third primary spiral cord appears suprasuturally, becoming as strong as other cords from third whorl on. Occasionally a weak, hardly visible, secondary spiral cord present from third whorl on. Penultimate whorl with 3 or 4 primary spiral cords, 1-4 weak secondary spiral cords between each pair of primary cords. Body whorl with 14-16 spiral cords, of which 6 on whorl with 1 or 3 (rarely 2) secondary spiral cords, and 8-10 broad, low spiral cords on siphonal canal.

First whorls with 9-11 strong axial ribs, running from suture to suture. Interspaces broad. Body whorl with 12 or 13 axial ribs.

Aperture semi-ovate. Columella gently curved. Outer lip thin, edge sharp. Siphonal canal short.

Periostracum, radula and operculum unknown.

Comparison. Although *A. borbonica* sp. nov. is only known from subadult specimens, it is already possible to distinguish this species from *A. cartilago* sp. nov. The morphological differences in species of *Amiantofusus* are more manifest on the upper whorls. For differences with *A. cartilago* sp. nov. we refer to the comparison under that species.

Amiantofusus sebalis sp. nov. differs by the more slender shape, the presence of a subsutural concavity and the different spiral sculpture (2 primary cords only, the occasional visible third cord being suprasutural instead of being on the subsutural slope).

Etymology. *Amiantofusus borbonica* sp. nov. is named after Ile Borbon, also called Ile Bourbon, the ancient name for Reunion.

Figures 46-57

46-47. *Amiantofusus gloriabundus* sp. nov., holotype, 34.8 mm, Field Bank, MUSORSTOM 7, stn DW598, 702-708 m, MNHN 7063.

48-49. *Amiantofusus* species 2, 30.6 mm, Vanuatu, MUSORSTOM 8, stn CP1125, 1160-1220 m, MNHN.

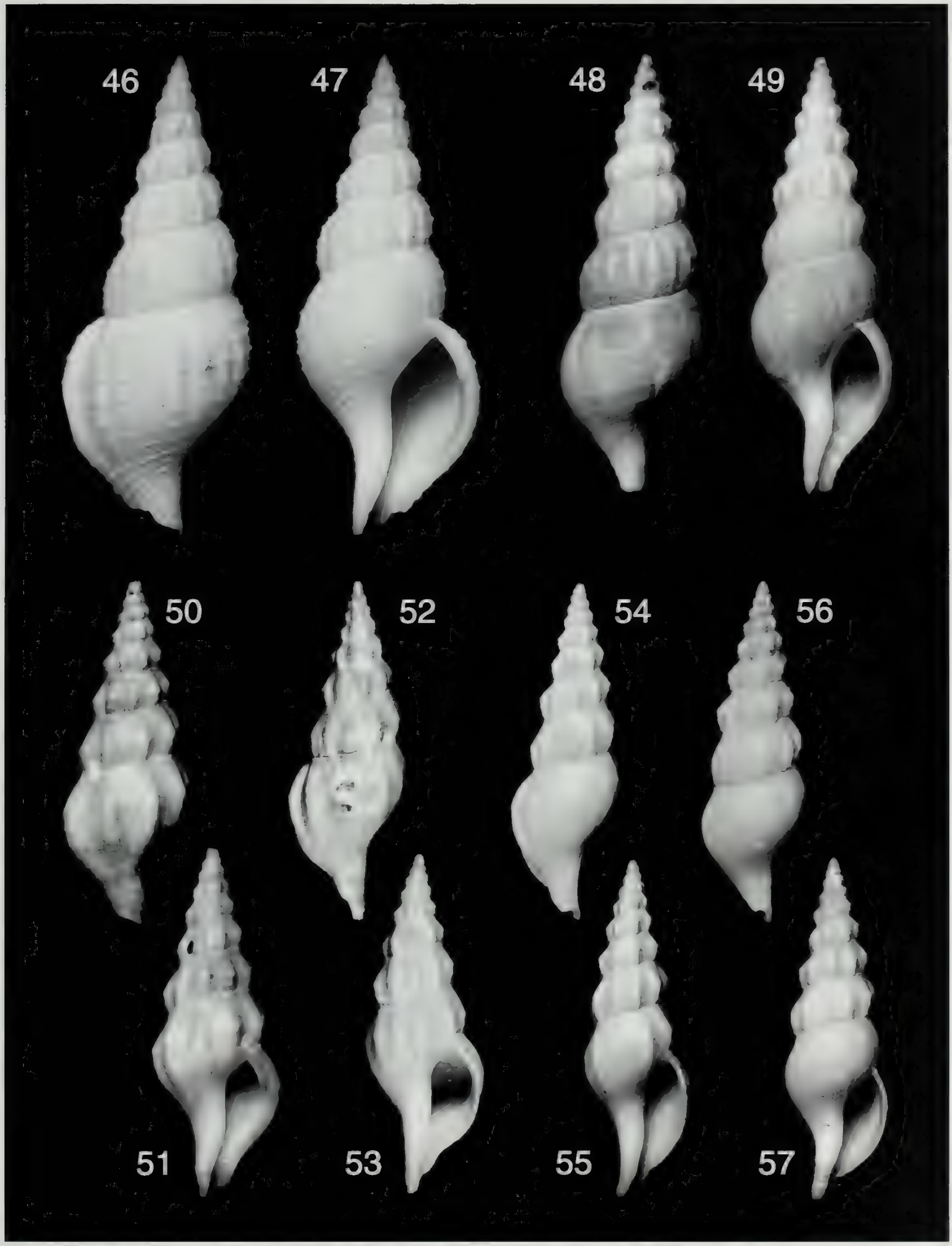
50-53. *Amiantofusus maestratii* sp. nov.

50-51. paratype, 24.3 mm, eastern New Caledonia slope, BATHUS 1, stn CP661, 960-1100 m, MNHN 7060;

52-53. holotype, 28.9 mm, southern New Caledonia slope, BIOCAL, stn CP30, 1140 m, MNHN 7043.

54-57. *Amiantofusus sebalis* sp. nov.

54-55. holotype, 23.6 mm, eastern New Caledonia, BATHUS 1, stn CP661, 960-1100 m, MNHN 7062; **56-57.** paratype 1, 26.4 mm, smooth form, same locality, MNHN 7042.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Amiantofusus cartilago sp. nov.

Figs 33, 58-61

Type material. Holotype (30.8 mm) (Mozambique Channel), MNHN 7045. Paratypes 1-2 (same locality), KF nrs. 3462, 4063. Paratype 3, EM.

Type locality. Mozambique Channel, off Morondova, Madagascar, trawled by shrimpers, 500-800 m.

Material examined. Mozambique Channel: off Morondova, Madagascar, trawled by shrimpers, 500-800 m, 2 dd, MNHN, KF 4063 (holotype and paratype 1). - Off Majenga, Madagascar, trawled by shrimpers, 800-1000 m, 1 dd deformed, KF 3462 (paratype 2). - Off Tulear, Madagascar, 600-800 m, 1 dd, EM (paratype 3).

Distribution and habitat. Currently only known from Mozambique Channel, the type locality. All specimens are empty shells, found on white muddy sand, together with, among many others, *Fusinus retiarius* (von Martens, 1901), *F. virginiae* Hadorn & Fraussen, 2002, *F. jurgeni* Hadorn & Fraussen, 2002, *Metula crosnieri* Bouchet, 1988, *Manaria formosa* Bouchet & Warén, 1986, *Eosipho engonia* Bouchet & Warén, 1986 and *Fissidentalium metivieri* Scarabino, 1995.

Description. Shell of medium size (up to 35.6 mm), thick, solid, fusiform, slender with high spire and short siphonal canal. White.

Protoconch decollate in all studied specimens except holotype (about 1 1/3 remaining whorls), white, covered with small, rather straight axial riblets, and ornamented with suprasutural spiral cord.

Teleoconch consisting of 8 1/2 whorls.

First teleoconch whorl with 2 primary spiral cords, weak in interspaces, strong on axial ribs, forming well developed knobs, a weak subsutural cord present. Penultimate whorl with 4 primary spiral cords, 3 weak secondary spiral cords between each pair of primary cords. Body whorl with 7 or 8 primary spiral cords, each interspace with 3 or 4 secondary spiral cords, and about 12 broad, low spiral cords on siphonal canal.

First whorls with 9-11 strong axial ribs, running from suture to suture. Interspaces broad. Penultimate whorl with 10-12 axial ribs, body whorl with 9 or 10 ribs. Paratype 3 with slightly deformed shape, last whorls without axial sculpture.

Aperture semi-ovate. Columella gently curved. Outer lip thin, edge sharp. Siphonal canal short.

Periostracum, radula and operculum unknown.

Comparison. *Amiantofusus cartilago* sp. nov. is characterized by a bigger last protoconch whorl (instead of becoming narrower), a larger and solid shell, and the presence of a weak subsutural cord on the first 3 teleoconch whorls.

Buccinid species assigned to the genus *Manaria* Smith, 1906 (type species: *Manaria thurstoni* Smith, 1906, India) look rather similar to *A. cartilago* sp. nov. but differ by the spiral sculpture consisting of a higher number of primary spiral cords but a lower number of secondary cords, and by the axial sculpture consisting of stronger ribs but lesser developed knobs on the spiral cords.

Fusinus retiarius (von Martens, 1901), collected by the same vessels as *A. cartilago* sp. nov., looks similar but differs by the broader spire, the stronger spiral sculpture, and the protoconch without axial riblets.

Amiantofusus borbonica sp. nov. differs by the more narrow last protoconch whorl, the absence of the weak subsutural cord on the first 3 whorls, and the shape of the spire which is slightly broader.

Etymology. This species name is derived from *cartilago* (Latin) meaning "cartilage". The white shell with a smooth surface rather looking as made from this material.

Species with uncertain generic placement

Fusus thielei Schepman, 1911

Figs 26-27

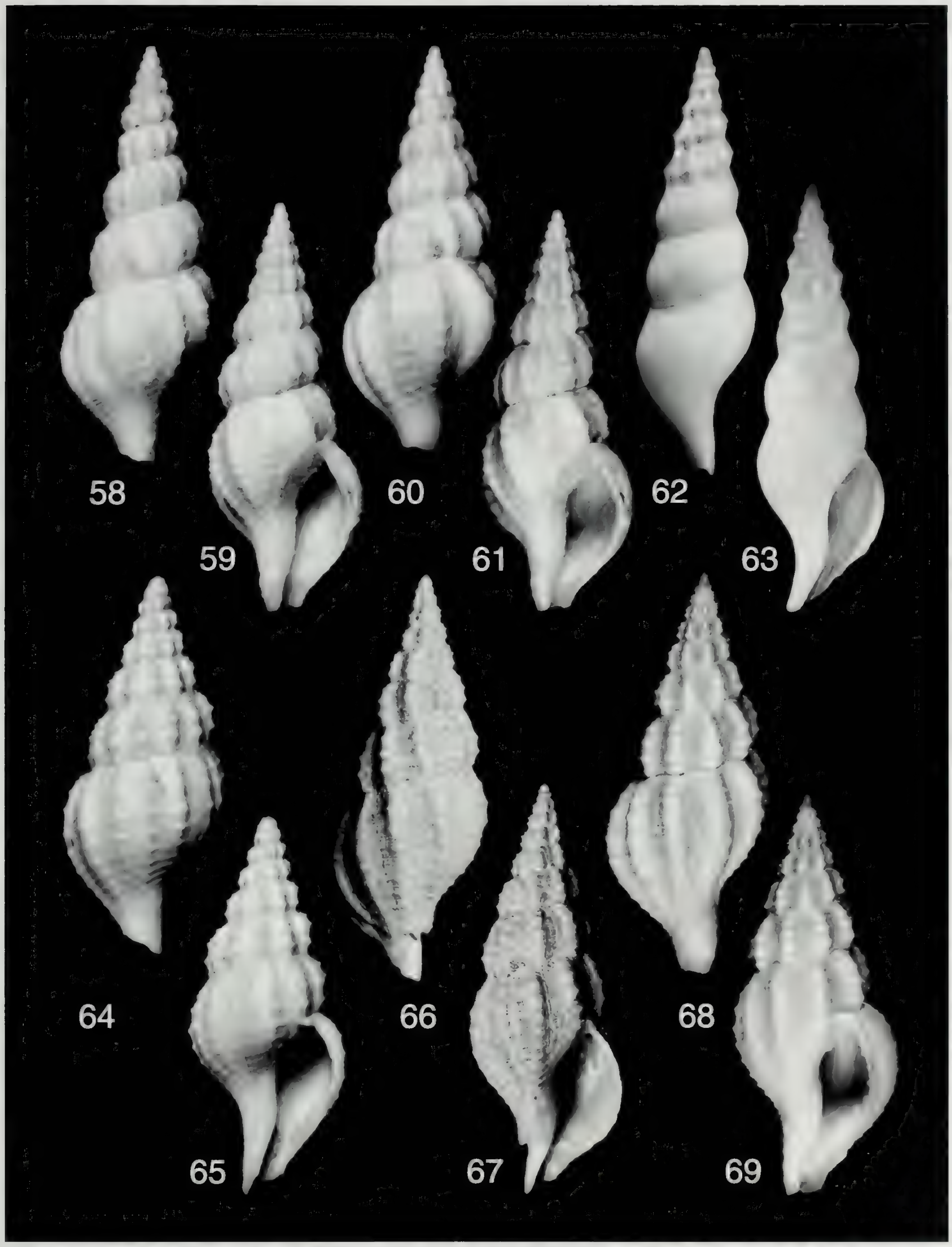
Fusus thielei Schepman, 1911: 291, pl. 19, fig. 2, type locality Timor Sea, SIBOGA, stn 300, 10°48'6''S, 123°23'1''E, 918 m, in ZMA.

Material examined. Holotype in ZMA.

North Fiji Basin, Vitiaz Zone: MUSORSTOM 7, stn DW576 (Waterwitch Bank), 12°31'S, 176°53'W, 680-685 m, 1 dd.

Figures 58-69

58-61. *Amiantofusus cartilago* sp. nov.
58-59. paratype 1, 34.5 mm, Madagascar, off Morondava, 500-800 m, KF 4063; **60-61.** holotype, 30.8 mm, same locality, MNHN 7045.
62-63. *Amiantofusus candoris* sp. nov., holotype, 29.0 mm, southern Coral Sea, Chesterfield Islands, south east Fairway, EBISCO, stn CP2648, 458-750 m, MNHN 9962.
64-65. *Amiantofusus borbonica* sp. nov., holotype, 12.0 mm, Reunion, off Pointe des Cascades, MD32, stn DC10, 930-980 m, MNHN 7044.
66-69. *Amiantofusus pacificus* sp. nov.
66-67. 21.9 mm, off eastern Taiwan, TAIWAN 2000, stn DW56, 438 m, MNHN; **68-69.** "form E", 24.9 mm, North Fiji Basin, Field Bank, MUSORSTOM 7, stn DW597, 469-475 m, MNHN.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This species is much similar to *Amiantofusus pacificus* sp. nov. but differs by having a broader shape, a slightly deeper subsutural concavity, a more twisted columella, sharp spiral cords on the base with wider and smooth interspaces. The radula differs from *Amiantofusus* by having an oval central tooth. The holotype and the specimen from North Fiji Basin are the single known specimen, but both have a decollate protoconch, consequently we cannot ascertain nor refuse the placement of this species in *Amiantofusus*.

Excluded species

Latirus rugosissimus (Locard, 1897)

Clathurella rugosissima Locard, 1897. Material from East Atlantic seamounts (Meteor, Hyères, Plato and Atlantis seamounts) assigned to *Latirus* Montfort, 1810 by Gofas (2000: 13-14). This species has a protoconch identical to *Amiantofusus* gen. nov. We follow the opinion of Gofas, based on morphological characteristics of the teleoconch sculpture.

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Novapex 8 (3-4): 103-110, 10 décembre 2007

On the discovery of *Semipallium coruscans coruscans* (Hinds, 1845) (Bivalvia: Pectinidae) in the Adriatic Sea [1]

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KEYWORDS. Bivalvia, Pectinidae, *Semipallium coruscans coruscans*, *Manupecten pesfelis*, Adriatic Sea.

ABSTRACT. The report of *Semipallium coruscans coruscans* (Hinds, 1845) from the Adriatic Sea is the subject of discussion. Some juvenile pectinid species collected in association with *Corallium rubrum* (Linné, 1758) were studied and one of the authors (J. P.) noticed that juvenile specimens of *Manupecten pesfelis* (Linné, 1758) show great similarity with *S. coruscans coruscans* (Hinds, 1845) reported from the Adriatic Sea. Subsequently we decided to make a broader study of these two species and at the end of our study we can confirm that the report of *Semipallium coruscans coruscans* from the Adriatic Sea is a misidentification of *Manupecten pesfelis*. We noticed that *Semipallium coruscans coruscans* was transferred to the genus *Pascahinnites* Dijkstra & Raines, 1999.

INTRODUCTION

The work of Šiletić (2004) about the discovery of a single specimen of *Semipallium coruscans coruscans* (Hinds, 1845) from Mljet Island, Croatia came to the knowledge of the first author and he noticed that this specimen is very similar to some specimens from his collection already identified as juvenile specimens of *Manupecten pesfelis* (Linné, 1758). To confirm his supposition we tried to find some other specimens and met with success. In some shell grit collected by fishermen on red coral, off Mljet Island at depths from 60 to 90 m, we found many pectinid specimens, some of which were *M. pesfelis* at different stages of growth.

Moreover, Šiletić confirmed her first report in a second work (Šiletić, 2006) where she specified that the specimen was collected at depth of 80 m, on a colony of *Cellaria fistulosa* (Linné, 1758) a Bryozoa less calcified than red coral.

After examination of the specimens from Mljet Island we compared them with some specimens of *S. coruscans coruscans* from Raiatea Island, French Polynesia, and so far as possible we compared shells of a similar size.

SYSTEMATICS

Family **PECTINIDAE** Wilkes, 1810
Subfamily **CHLAMYDINAE** von Teppner, 1922
Genus ***Manupecten*** Monterosato, 1889
Manupecten pesfelis (Linné, 1758)
Genus ***Semipallium*** Jousseaume in Lamy, 1928
Semipallium coruscans coruscans (Hinds, 1845)

Distribution of the two species. The distribution of *Manupecten pesfelis* was reported by Linné (1758) from "*O. Africano*" (incorrect locality) as stated by Dijkstra (1999) who gives a new restricted locality: "*Mediterranean Sea*". It was also reported by Wagner (1991) as: "The species is confined to the Mediterranean and the adjacent area of the Atlantic Ocean from Portugal to the Azores and south to Cape Verde" and about habitat he wrote: "On gravelly or corallinous bottoms from 10 to 250 m". Some years after Dijkstra & Goud (2002) reported: "Mediterranean Sea and adjacent region of eastern Atlantic from Portugal southwards to the Cape Verde Islands. Living littorally to bathyal depths among coral rubble or gravel on sandy bottoms. Present material dead in 0-540 m". Recently Raines & Poppe

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[1] After this article had been reviewed by referees and accepted by the editor, the authors became aware of a similar work published by Trono & Resta (2007). Notwithstanding, they decided to publish their paper because it contains useful illustrations and important information about the distribution and the description of both species.

Trono, D. & Piccioli Resta, G. 2006 (2007). Sull'errata segnalazione di *Semipallium coruscans coruscans* (Hinds, 1845) (Bivalvia: Pectinidae) in Mediterraneo. *Bolletino Malacologico* 42(9-12): 101-105.

(2006) report it as: "From Mediterranean Sea and the adjacent Atlantic Ocean; from Portugal to Cape Verde including the Azores and Canary Islands" and about habitat they report: "Littoral to sublittoral zone, under rocks on gravelly sandy bottoms with coral rubble".

We report that *M. pesfelis* on the Dalmatian coast is rather common in the infralittoral zone, and in coral bottoms. In shell grit coming from red coral bottoms, 40-100 m deep, live specimens are of small or medium size while big specimens are rare and usually dead.

It lives, attached with a byssus, in fissures in the rocks and in poorly lit caves because it is adverse to light, so it is difficult to find live specimens because they live deep in the fissures.

It also likes the old walls built to protect the small harbours and many big and beautiful specimens were collected in these places at a depth of 1-2 m.

The first author never found this species under stones where, on the contrary, *Mimachlamys varia varia* (Linné, 1758) and *Talochlamys multistriata* (Poli, 1795) are very common.

CLEMAM (2007) gives a different genus to these species but we prefer to use the names proposed by Dijkstra & Goud (2002) and Dijkstra & Gofas (2004) because we noticed that CLEMAM is not updated with the names used in these two works.

The type locality of *Semipallium coruscans coruscans* is: Anna Maria Port, Nukuhiva, Marquesas Islands and it lives byssally attached in areas with clear water and it prefers areas through which strong streams run on the external side of the reefs or the passage to the internal lagoon, at a depth of about few dm up to about 20 m (Dijkstra, 1983). The report of Raines & Poppe (2006) is short: "Indo-Pacific region, to include the eastern and southern coast of Africa". The habitat is stated as: "littoral zone, byssally attached to rocks or coral on sandy bottom", no depth is given.

The species is not reported for the Red Sea by Oliver (1992) and Orlin & Dekker (2000) as already stated by Šiletić (2004) so it cannot be considered a lessepsian migrant.

Material examined. *Manupecten pesfelis* from Mljet Island (Croatia) 60-90 m deep: 1 specimen of 2.5 mm, 1 specimen of 3.6 mm, 1 specimen of 6.7 mm and 1 specimen of 13.0 mm all from Giunchi-Tisselli collection ex Jakov Prkić collection (Figs 1-7).

Semipallium coruscans coruscans from Raiatea Island (French Polynesia): 1 specimen of 5.5 mm, 1 specimen of 9.0 mm and 1 specimen of 10.7 mm all from Giunchi-Tisselli collection (Figs 8-13).

Description of our material. *Manupecten pesfelis.* The sculpture of adult specimens consists of 7 or 8 primary radial ribs and numerous secondary radial riblets on and between primary ribs. The entire surface of the shell is covered with a layer consisting of very fine honeycomb-like microsculpture, giving the shell a shagreen look. This layer is relatively soft and it can be easily removed or damaged. When removed or eroded a fine reticulating pattern of lamellae covers the whole valve (Figs 31, 34). Left valve has primary ribs more pronounced, more rounded and the intercostals spaces are larger than the ribs. In the right valve these ribs are flattened and larger than intercostals spaces. The number of secondary riblets is varied on and between primary ribs. Ribs of anterior auricles are also different and in the left valve these ribs are nodulous while in the right valve they are lamellose. On the dorsal margin of posterior auricles there are 5-6 strong tubercles (Fig. 33).

The sculpture of juvenile specimens is quite different from that of adult ones.

In our smallest specimen of 2.5 mm (Figs 1-2) both valves are sculptured with thin radial striae and a shagreen microsculpture is not yet formed, only microscopic lamellae and grooves are visible.

In our specimen of 3.6 mm (Fig. 3), which is almost identical to that figured in the work of Šiletić (2004), already is present a shagreen microsculpture and some secondary riblets are formed.

In our specimen of 6.7 mm (Figs 4-5) both valves are sculptured with primary and secondary riblets, irregularly arranged, and a shagreen microsculpture covers the entire surface of the valves except in the umbonal area. In this growth stage tubercles on the dorsal margin of auricles are not yet formed.

In our specimen of 13.0 mm (Figs 6-7) there is already a sculpture similar to that in adult specimens. Primary radial costae are well formed and secondary radial riblets are on and between the primary ribs. On the anterior auricle of the left valve the ribs become nodulous and on the edge of posterior auricle there is a strong tubercle. In this specimen too the entire surface of both valves is covered with a shagreen microsculpture.

Semipallium coruscans coruscans. The sculpture of our specimens (Figs 8-13) consist of 14 or 15 primary radial ribs, regularly arranged, and numerous secondary riblets mostly on primary ribs and very few between them. The layer with shagreen microsculpture is eroded in all our specimens and a fine reticulating pattern of lamellae covers the valves. Only on left valve of our specimen of 5.5 mm is one small part of this shagreen microsculpture preserved (Fig. 21).

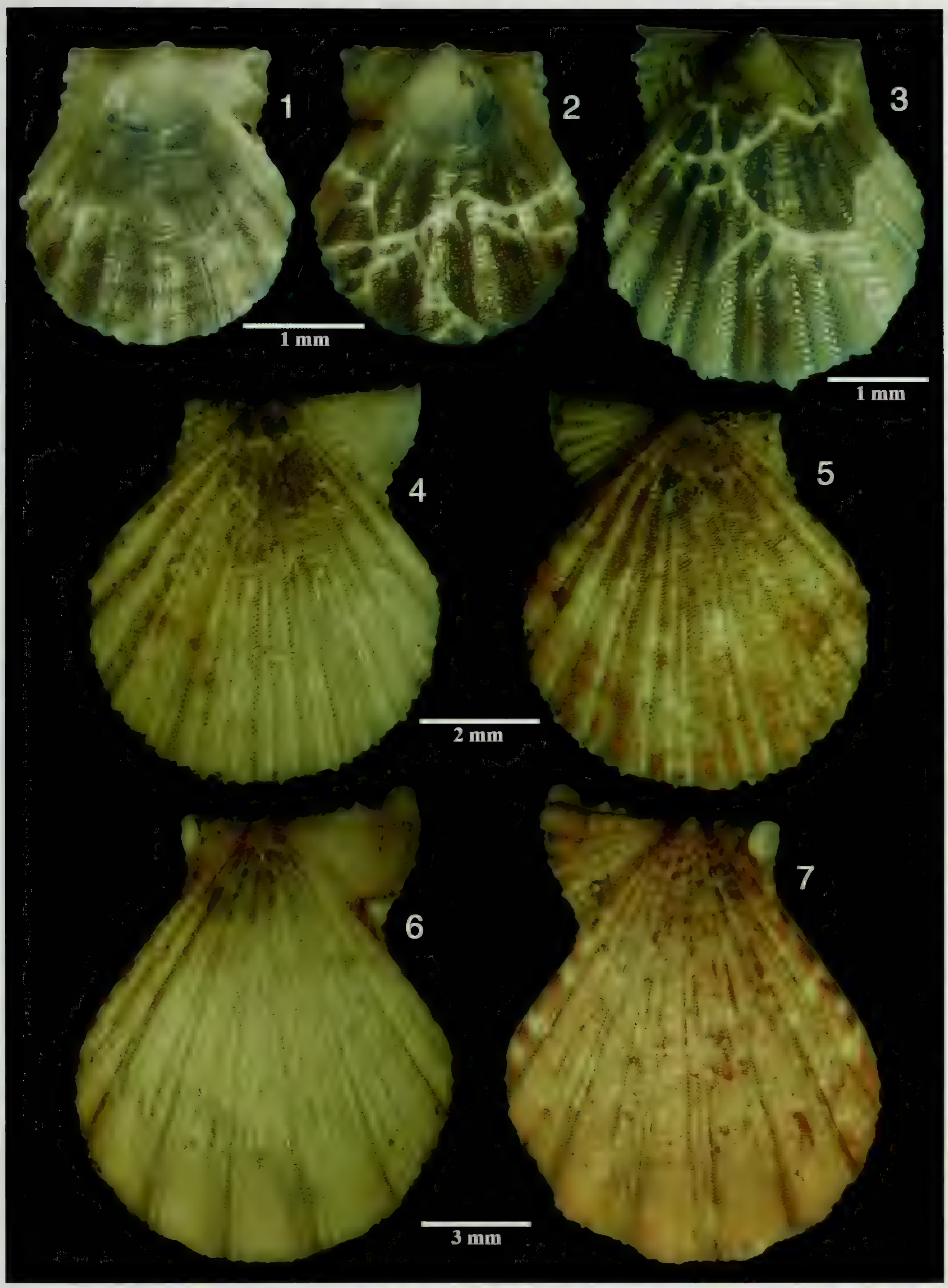
In between the secondary riblets a series of microscopic pits can be seen.

On the dorsal margin of auricles tubercles are absent.

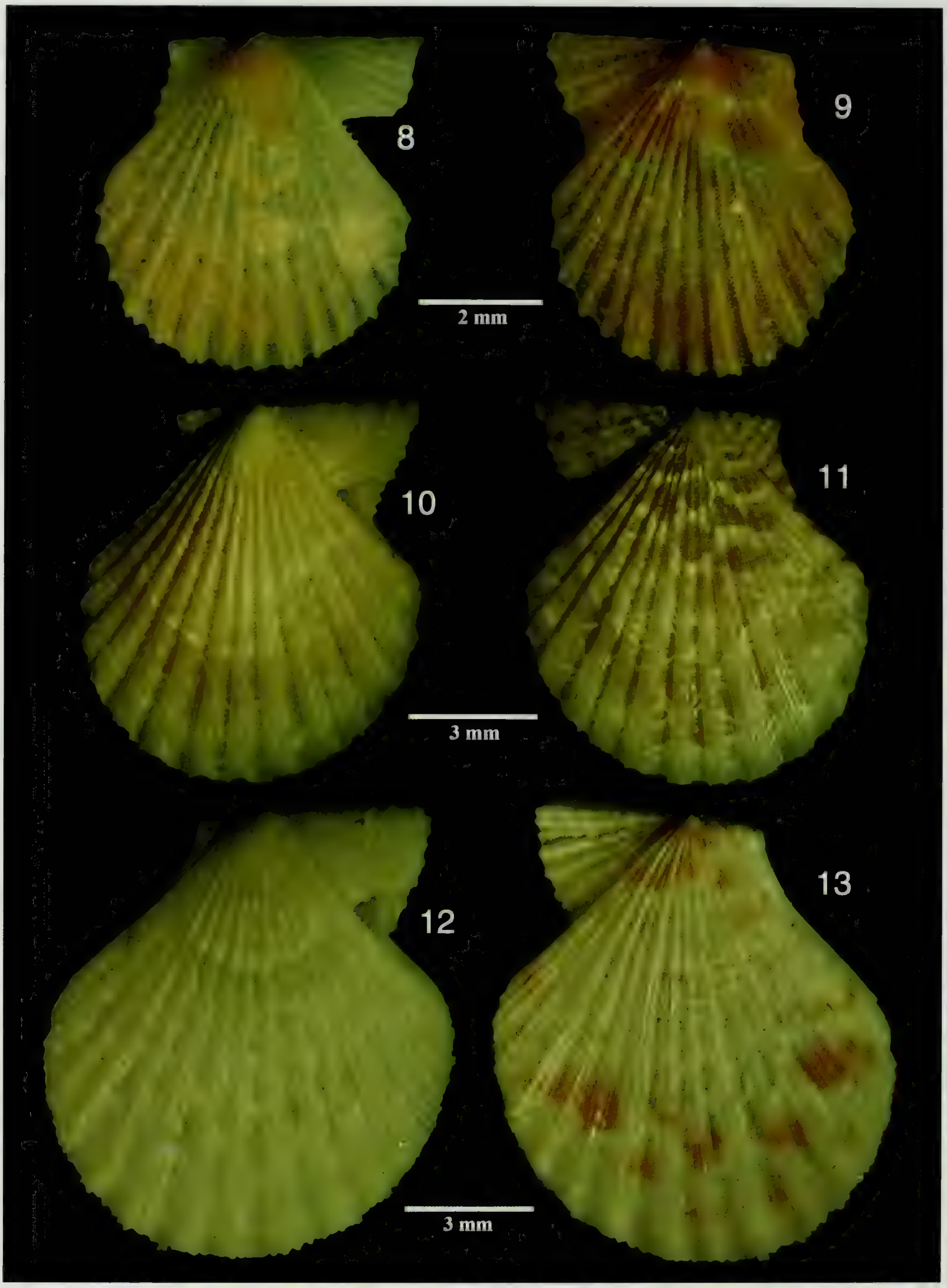
Discussion and conclusion. The main differences that distinguish *M. pesfelis* from *S. coruscans coruscans* are the large tubercles on the auricles and distinctly lower number of primary ribs (7 or 8 against 14 or 15). The adult specimens are also much bigger (65-85 mm against 15-22 mm).

The comparison of juvenile specimens of *M. pesfelis* and *S. coruscans coruscans* of about the same size, also show some differences.

The shagreen microsculpture is similar in both species but in *M. pesfelis* it is more prominent and the cells



Figures 1-7. *Manupecten pesfelis* (Linné, 1758) from Mljet Island (Croatia), 60-90 m. **1-2.** H = 2.5 mm, **1.** right valve, **2.** left valve; **3.** H = 3.6 mm, left valve; **4-5.** H = 6.7 mm, **4.** right valve, **5.** left valve; **6-7.** H = 13.0 mm, **6.** right valve, **7.** left valve.



Figures 8-13. *Semipallium coruscans coruscans* (Hinds, 1845) from Raiatea Island (French Polynesia). **8-9**. H = 5.5 mm, **8.** right valve, **9.** left valve; **10-11**. H = 9.0 mm, **10.** right valve, **11.** left valve; **12-13**. H = 10.7 mm, **12.** right valve, **13.** left valve.

are deeper and larger than those in *S. coruscans coruscans*. It seems that, in the second species, this microsculpture is very delicate and consequently it is usually eroded while in juvenile specimens of *M. pesfelis* it is usually very well preserved.

In the Indo-Pacific species primary radial ribs are well formed and regularly arranged in all three specimens (Figs 8-13) while in *M. pesfelis* these ribs are irregularly arranged (Figs 3-5). Only in size of 13 mm *M. pesfelis* (Figs 6-7) show well-formed primary ribs but they are different in number and shape than those in *S. coruscans coruscans* of the similar size.

Also the sculpture of auricles is different and in *M. pesfelis* radial and concentric sculpture are more prominent (Figs 14-29). In the size of 13 mm *M. pesfelis* already has one strong tubercle on the edge of posterior auricles (5-6 in adult ones).

The series of microscopic pits which are visible in between secondary riblets of *S. coruscans coruscans* are not present in *M. pesfelis*.

Šiletić (2004) described *S. coruscans coruscans* (from Indo-Pacific region) as follows: "exterior shell surface main characteristic are: 12-15 primary tripartite radial ribs, from which 1-2 intercostals secondary radial riblets are formed, determining about 65 secondary riblets and a shagreen microsculpture between the costae". This description agrees very well with our specimens from Raiatea Island.

She described the single specimen from Croatia as follows: "Our specimen of *Semipallium coruscans coruscans* is 4.8 mm high and 5.2 mm long 14 radial ribs are present, with some secondary riblets in initial stage that however form a strongly developed shagreen microsculpture on the lower half of the shell, near the ventral side of the shell. The colour of the shell is yellowish-brown, with white tinges and blotches in the centre of the shell, and a brownish part near the umbo, at the beginning of the auricles". Our specimen of 3.6 mm (Fig. 3) agrees very well with this description.

After these observations it is obvious that the only specimen figured by Šiletić (2004) belongs to the same species as our specimens from Mljet Island so that the report of *Semipallium coruscans coruscans* from Adriatic Sea should be considered as a misidentification of *Manupecten pesfelis*.

Our conclusion is also supported by CLEMAM (2007) and CIESM (2007): they do not report this alien species in their lists.

We notice now that *Semipallium coruscans coruscans* (Hinds, 1845) should be placed in the genus *Pascahinnites* Dijkstra & Raines, 1999 as stated by Paulay (2003).

ACKNOWLEDGEMENTS

We wish to thank Dr. H.H Dijkstra (University of Amsterdam, The Netherlands) for some information about bibliography.

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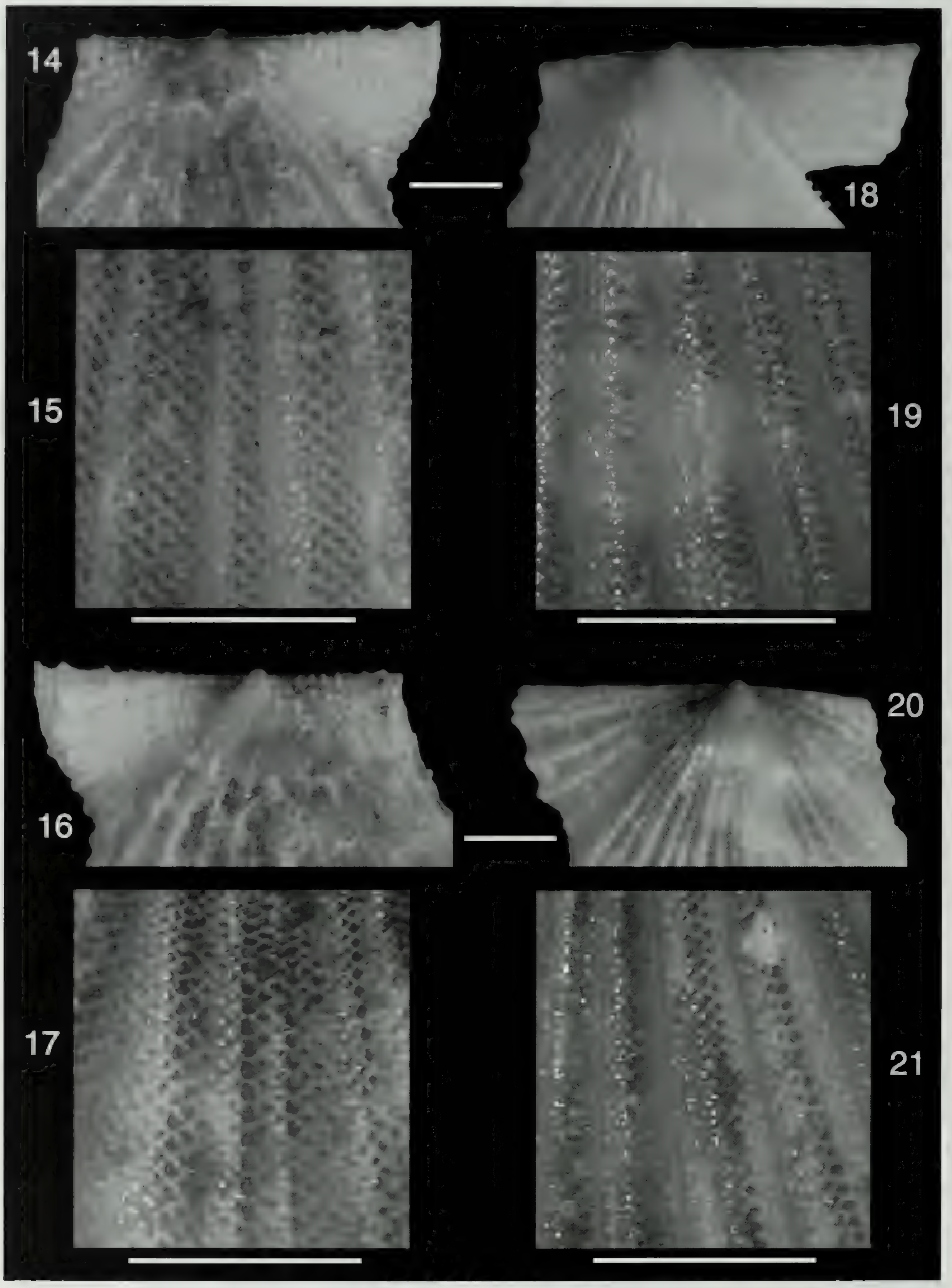
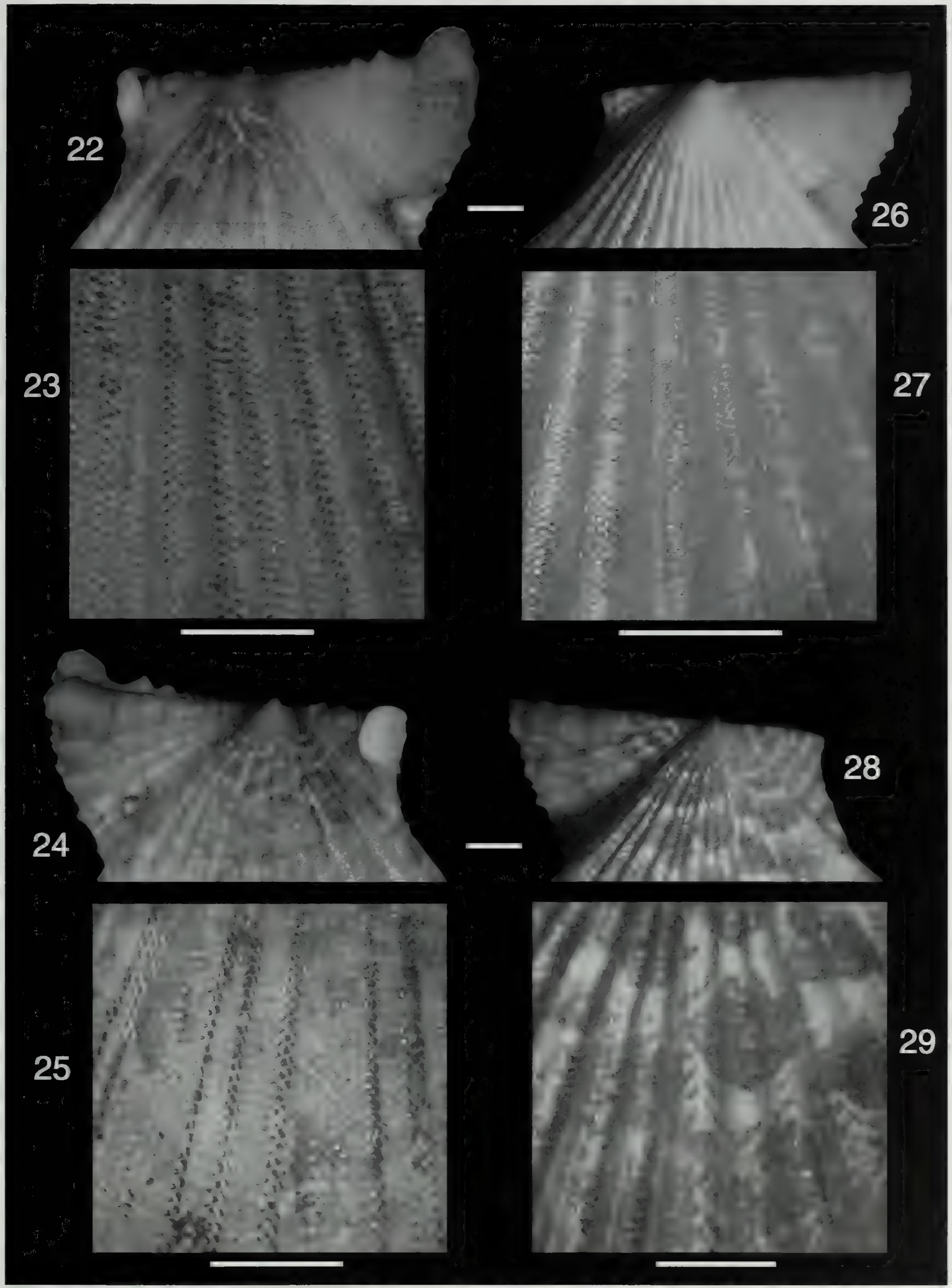
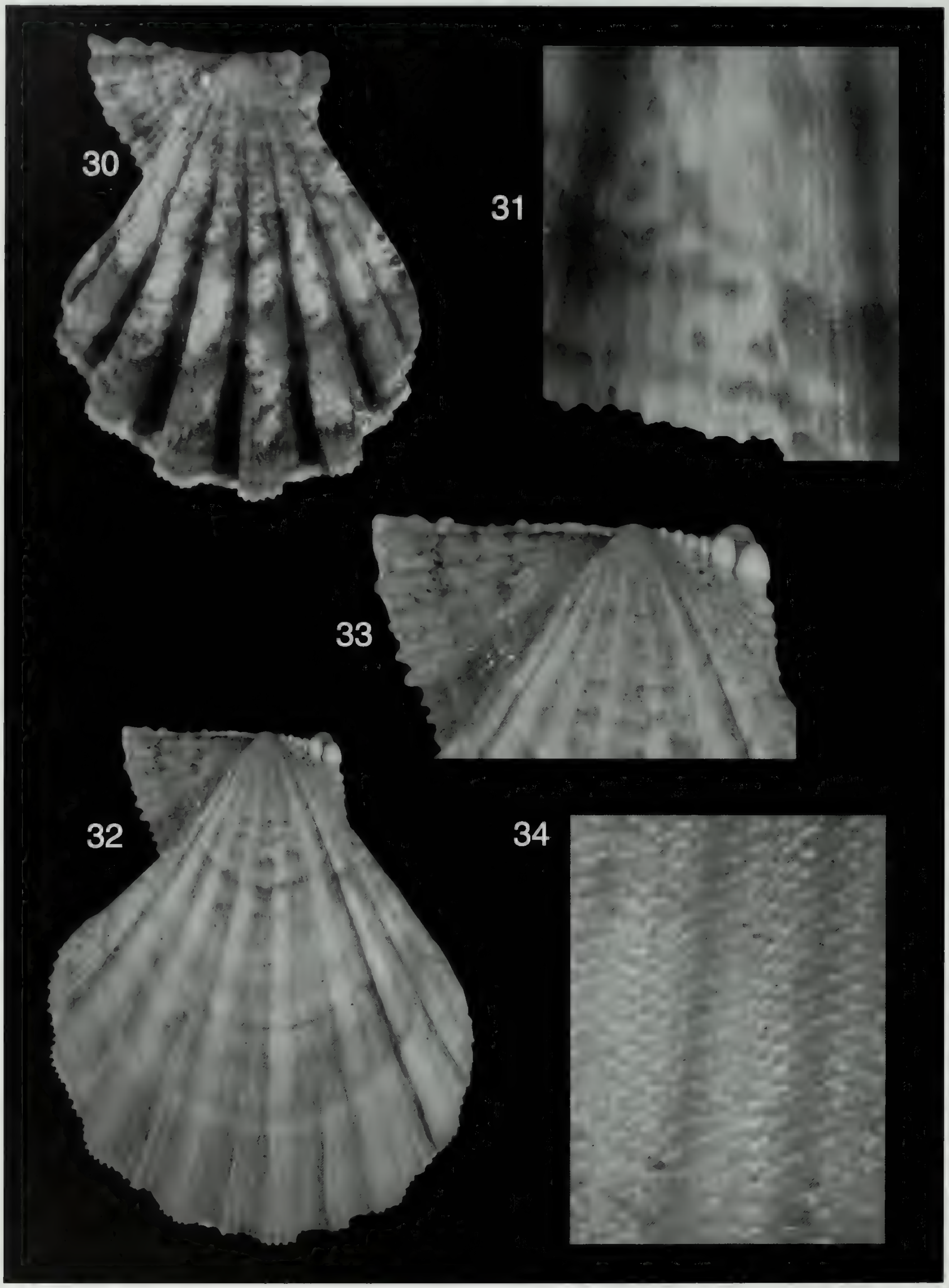


Figures 14-17. *Manupecten pesfelis* (Linné, 1758) from Mljet Island (Croatia), 60-90 m, size 6.7 mm. **14.** auricles of the right valve, **15**. detail of the right valve, **16.** auricles of the left valve, **17.** detail of the left valve; **18-21**. *Semipallium coruscans coruscans* (Hinds, 1845) from Raiatea Island (French Polynesia), size 5.5 mm. **18.** auricles of the right valve, **19**. detail of the right valve, **20**. auricles of the left valve, **21**. detail of the left valve. Scale bar = 1 mm.



Figures 22-25. *Manupecten pesfelis* (Linné, 1758) from Mljet Island (Croatia), 60-90 m, H = 13.0 mm. **22.** auricles of the right valve, **23**. detail of the right valve, **24.** auricles of the left valve, **25.** detail of the left valve; **26-29**. *Semipallium coruscans coruscans* (Hinds, 1845) from Raiatea Island (French Polynesia), H = 9.0 mm. **26.** auricles of the right valve**, 27**. detail of the right valve, **28**. auricles of the left valve, **29**. detail of the left valve. Scale bar = 1 mm.



Figures 30-34. *Manupecten pesfelis* (Linné, 1758). **30.** specimen from Secca delle Murelle (Viterbo, Italy), H = 22.0 mm, **31**. detail of sculpture; **32.** specimen from Altafiumara (Reggio Calabria, Italy), H = 60.0 mm, **33.** detail of auricles, **34.** detail of sculpture.

Morum (Oniscidia) domingense from the Caribbean Neogene *vs.* the Recent *M. (O.) lindae*: One taxon or two?

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KEYWORDS. Gastropoda, Harpidae, *Morum*, Caribbean, Neogene.

ABSTRACT. The *Morum chipolanum*-group of *Morum (Oniscidia)* species has a long geologic history in Tropical America, although their specimens are never abundant. Most of the original descriptions were based on very few shells. The lack of information concerning intraspecific variability makes classification sometimes difficult within this group of species with somewhat conservative shell design. This study attempts to distinguish several Caribbean Neogene taxa on the basis of combined shell morphometry and qualitative shell characteristics, paying special attention to the distinction between the shells of *M. (O.) domingense* from the Upper Miocene-Lower Pliocene of the Dominican Republic and those of the Recent *M. (O.) lindae* from the coasts of Colombia and Venezuela, in order to ascertain if they should be assigned to the same or to distinct taxa. The largest number of specimens yet considered is assembled, drawn from adequately illustrated specimens in the literature, collections and high quality digital photographs posted on the Internet. Analysis shows that by morphometry alone these two taxa cannot be reliably distinguished, but when the morphometric data is considered in combination with other observable shell characteristics the two sets of shells are most likely distinct, actually representing two different taxa. This conclusion is further strengthened by palaeobiogeographical data.

INTRODUCTION

The genus *Morum* Röding, 1798, now placed in the family Harpidae Bronn, 1849 (Hughes & Emerson, 1987) superfamily Muricoidea Rafinesque, 1815 (Bouchet & Rocroi, 2005), comprises a small group of species of carnivorous marine gastropods (J. Smith *in* Beesley *et al.*, 1998), occurring in tropical to subtropical seas worldwide. They are found in shallow to fairly deep waters, but are always uncommon to very rare (J. Smith *in* Beesley *et al.*, 1998). The subgenus *Oniscidia* Mörsch, 1852 (= *Cancellomorum* Emerson & Old, 1963, see Vokes, 1998) comprises a group of *Morum* species with a cancellate sculpture; for full discussion on the taxonomic problems regarding the name *Oniscidia* we refer to Beu (1976) and Vokes (1998). In this paper we will only discuss what Vokes (1998) called the *M. chipolanum*-group of species, characterized by an ornamentation of elongated pustules on the parietal shield as opposed to coarse rugae, as seen in *Morum* ("*Oniscidia*") sp. from the Middle Eocene Gatuncillo Formation (Woodring, 1959) and the Recent Brazilian *M. (O.) matthewsi* Emerson, 1967.

A handful of species belonging to the *M. chipolanum*-group have been described from the Caribbean Neogene and Recent faunas.

The earliest Tropical American records are for the Peruvian *M. peruvianum* Olsson, 1931 from the Eocene Chira Formation (Olsson, 1931) and for *M. (O.) harpula* (Conrad, 1848) from the Lower Oligocene Vicksburg group of Mississippi, USA (MacNeil & Dockery, 1984).

From the Lower Miocene the following species have been reported: *Morum chipolanum* Dall, 1925 from the Chipola Formation of Florida, USA and Baitoa Formation of the Dominican Republic (see Vokes, 1998), and *M. (Onicidia) jungi* Landau, 1996 from the Cantaure Formation of Venezuela (see Landau, 1996). *M. harrisi* Maury, 1925, from the Lower Miocene Pirabas Limestone of Brazil, is based on internal moulds and its apertural features are unknown (Maury, 1925). *Morum (O.) coxi* (Trechmann, 1935) occurs in the lower Middle Miocene (Robinson &

Jung, 1972) Grand Bay Formation of Carriacou (Jung, 1971). In the Upper Miocene and Lower Pliocene assemblages *M. (O). domingense* (Sowerby, 1850) occurs in the Cercado, Gurabo and Mao Formations of the Dominican Republic (Vokes, 1998).

Morum (O.) meganae Raymond, 1997 was recently described from the Middle Pliocene Pinecrest Beds of Florida and *M. (O.) macgintyi* Smith, 1937 [*M. (O.) obrienae* Olsson & Petit, 1964, is almost certainly a junior synonym of *M. (O.) macgintyi* (Emerson, 1967; Vokes, 1998)] occurs in the Upper Pliocene Caloosahatchee Formation of Florida (Petuch, 1994).

The living *M. (O.) dennisoni* (Reeve, 1842), found from the coasts of Louisiana, USA south to the Caribbean, is immediately distinguished from this group by the larger size of fully adult specimens, by its weaker spiral sculpture, with cords of unequal strenght making it difficult often to distinguish cords of primary or secondary strength. This is not the case with any of the other species of the *M. chipolanum*-group in which all the cords are more strongly elevated and of roughly equal strength. The subsutral ramp of the last whorl in *M. (O.) dennisoni* is much wider than in any of the other members of the group and there is a marked thickening of the inner aspect of the outer lip mid-height in *M. (O.) dennisoni* not present in the other group members. Finally the pustules tend to be coarser in the shells of *M. (O.) dennisoni*. Rios (1994) suggested *M. (O.) lindae* was a synonym of *M. (O.) dennisoni*. At the time of publication probably only a couple of specimens of the latter were known, and Rios probably considered it a subadult specimen of *M. (O.) dennisoni*. However, as more material of *M. (O.) lindae* has become available it is clear these differences are consistent and not gerontic characters, as the smallest shell of *M. (O.) dennisoni* we have found is within the maximum size range of *M. (O.) lindae* and still shows these consistent differences.

Petuch (1981) assigned a specimen collected from 11 meters depth off the Goajira Peninsula, Colombia to *M. domingense*, noting at the time that the specimens of the species known from the fossil record had 12 axial ridges, whereas the Recent shell had 16. Subsequently, he reassigned the Recent specimen to *Morum (Cancellomorum) lindae* Petuch, 1987 (p. 95, pl. 23, Figs 1-2). He considered *M. domingense* "the direct ancestor" of *M. lindae* and noted that the fossil species: "(…) has fewer axial ribs, is broader and more angled, has a smaller parietal shield, and is far less sculptured and less squamose" (Petuch, 1987, p. 95).

Vokes (1998) accepted the distinction between the fossil and recent taxa, specifying that the number of axial ribs in the fossil shells of *M. (O.) domingense* varied from 10-12 and added that: "(…) the nature of the low stepped spire, with its incised suture and the numerous fine axial lamellae, suggests that *M. lindae* is the linear descendent of the more recently described Cantaure Formation *M. jungi* Landau (1996, p. 53, pl. 1, Figs 1-2) rather than of *M. domingense*." (Vokes, 1998, p. 20).

In all Caribbean assemblages in which *Morum* occurs it is uncommon to very rare and at the time when many of the above taxa were described, they where known from one or two specimens only. As larger numbers of shells have become available and the intraspecific variability better represented, the characteristics separating some of the taxa have become less clear.

This paper started as a discussion over the validity of *M. (O.) lindae* as a distinct taxon from the Mio-Pliocene *M. (O.) domingense*. For each argument put forward supporting their separation, a Recent shell refuting their isolation could be found. Therefore, in the light of the greater amount of material available, we attempt to clarify whether *M. (O.) lindae* and *M. (O.) domingense* are indeed distinct taxa by means of a morphometric comparison. We have added morphometric data on the shells of two further undisputed extinct species; *M. (O.) chipolanum* and *M. (O.) jungi* and the living *M. (O.) dennisoni* in order to investigate the interspecific variability within this group of gastropods with very similar shells. Although the number of shells used in this study is less than that usually used for morphometric studies, we stress that for all species this is the largest number of specimens so far available.

MATERIAL AND METHODS

Data for the fossil shells were obtained from measurements, rib and cord counts as well as observations of shell characteristics of the type material clearly illustrated in Landau (1996) and Vokes (1998) and further specimens in the Bernard Landau collection (*M. (O.) chipolanum*: 10 specimens, 3 from locality TU (Tulane University locality number) 458, 3 from TU 546, 5 from TU 826; *M. (O.) jungi*: 5 specimens from TU 1269; *M. (O.) domingense*: 34 specimens, 2 Cercado Formation from NMB (Naturhistorisches Museum Basel locality number 16832, 32 Gurabo Formation, 2 from TU 1354, 14 from TU 1215, 13 from TU 1219, 3 from TU 1373).

The shells of some *Morum (Oniscidia)* species display a considerable variation in size between fully adult specimens, herein interpreted as shells with a fully expanded parietal shield and thickened outer lip. In *M. chipolanum*, for example, adult shells range from 22.2 mm to 38.8 mm, *M. (O.) domingense* from 20.5 mm to 35.8 mm, adults of *M. (O.) jungi* seem more uniform in size. For the purpose of this study we have not included any adult specimen smaller than 23.5 mm in height.

Data for Recent shells of *M. (O.) lindae* were collected from three specimens in the Franck Frydman collection and a further 13 shells illustrated on the Internet (Femorale, 7 specimens; Jaxshells, 3 specimens; worldwideconchology, 1 specimen; mineralislamacla, 1 specimen). *M. (O.) dennisoni* data was collected from the Internet (Femorale 8). Only specimens illustrated with both ventral and dorsal views and with the correct standard orientation were considered. Whilst collecting data from images on the web may not usually be ideal, we suggest that for rare specimens such as this (the type material consists of the holotype alone) it is a useful way to consider the maximum number of specimens known. For this study internet data was collected from the following sites: Guest Shells (1996), Frank (1998), Coltro (2006); worldwideconchology.com (2006).

Measurements were taken as illustrated in Figure 1. Measurements of Internet photographs were taken with the measuring tool after copying the pictures into Photoshop, thereafter measurements calculated based on the original length given for each specimen. To minimize observer error all measurements were taken by the first author.

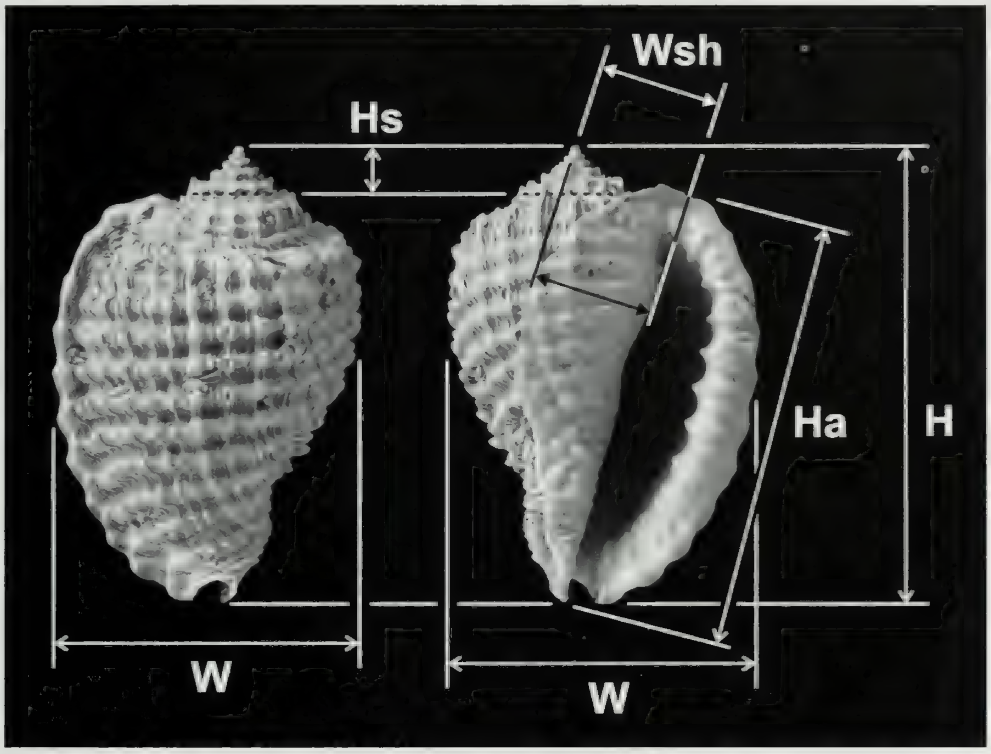

Figure 1. Morphometric measurements taken from a *Morum* shell.
H = total height, W = width of shell, Hs = height of spire, Ha = height of aperture, Wsh = maximum width of parietal shield.

RESULTS

Several specimens of the fossil taxa *M. (O.) domingense* and *M. (O.) chipolanum*, and one Recent shell of *M. (O.) lindae* had their protoconchs well preserved. In all three the protoconch was small, consisting of 1.25-1.5 smooth whorls with a small nucleus. This small paucispiral type of protoconch is highly suggestive of non-planktotrophic larval development. Bouchet (2002) reviewed data on Indo-Pacific *Morum* species and concluded that planktotrophy was the standard method of development in these species. He also noted that all the Caribbean species; *M. lindae*, *M. domingense*, and *M. dennisoni* had paucispiral protoconchs. It therefore seems that unlike the Indo-Pacific species, in the Caribbean non-planktotrophic development is the norm. This coincides with the type of development observed in the living western Atlantic species *Morum oniscus* (Linnaeus, 1767) (type species of *Morum*), which lays its eggs beneath small slabs of coral at low tide level. The eggs undergo direct development and the gastropods hatch as crawling young (Work, 1969). Protoconch morphology was not, therefore, useful in distinguishing between species within the *M. chipolanum*-group.

Morphometric results on the teleoconch show:

1. In relation to their overall shape, there is overlap between the specimens of four species when comparing width in relation to height, although

M. (O.) domingense tends to have a narrower, more elongated shell compared to the one of *M. (O.) lindae*. *M. (O.) dennisoni* can be separated from the pack having a relatively narrower shell in relation to height (Fig. 2).

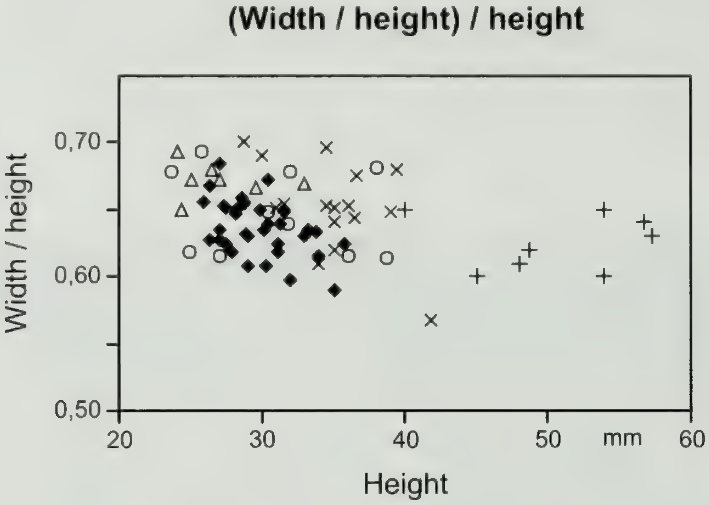

Figure 2. Morphometric plot of (width/height)/height. ◆ - *M. domingense*; ○ - *M. chipolanum*; △ - *M. jungi*; × - *M. lindae*; + - *M. dennisoni*.

2. None of the species, except *M. dennisoni*, can be distinguished on the basis of relative spire height or apertural height (Figs 3, 4).

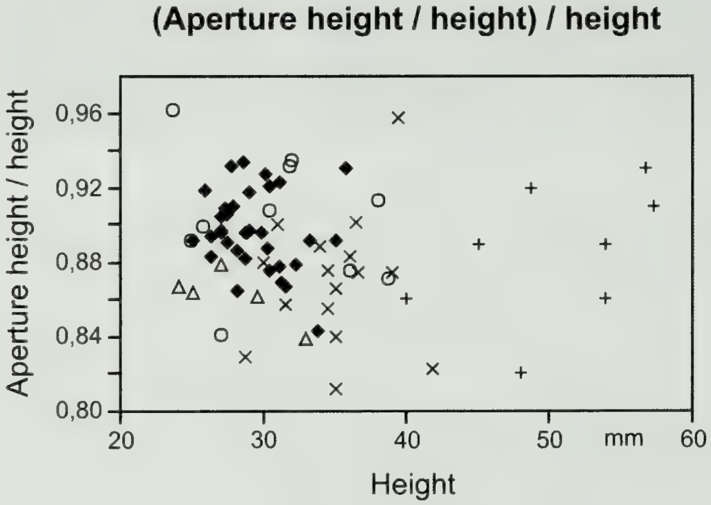

Figure 3. Morphometric plot of (aperture height/height)/height. ◆ - *M. domingense*; ○ - *M. chipolanum*; △ - *M. jungi*; × - *M. lindae*; + - *M. dennisoni*.

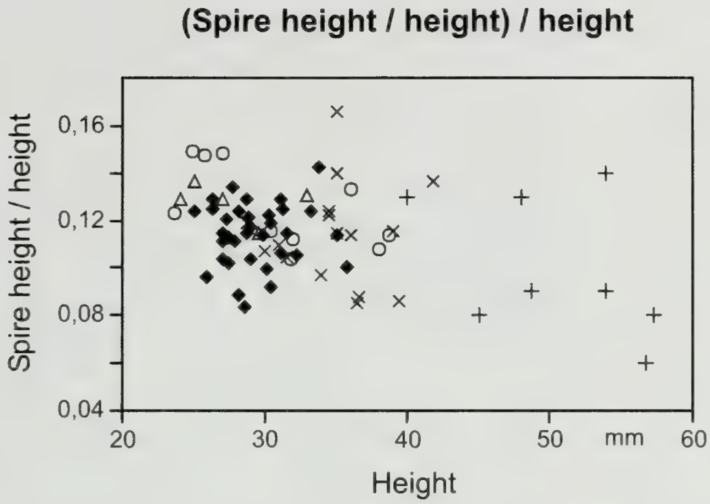

Figure 4. Morphometric plot of (spire height/height)/height. ◆ - *M. domingense*; ○ - *M. chipolanum*; △ - *M. jungi*; ✕ - *M. lindae*; + - *M. dennisoni*.

3. *M. (O.) chipolanum* has the broadest parietal shield of the five species, although there is some overlap with *M. (O.) domingense* and *M. (O.) lindae*, there is no overlap with *M. (O.) jungi* (Fig. 5).

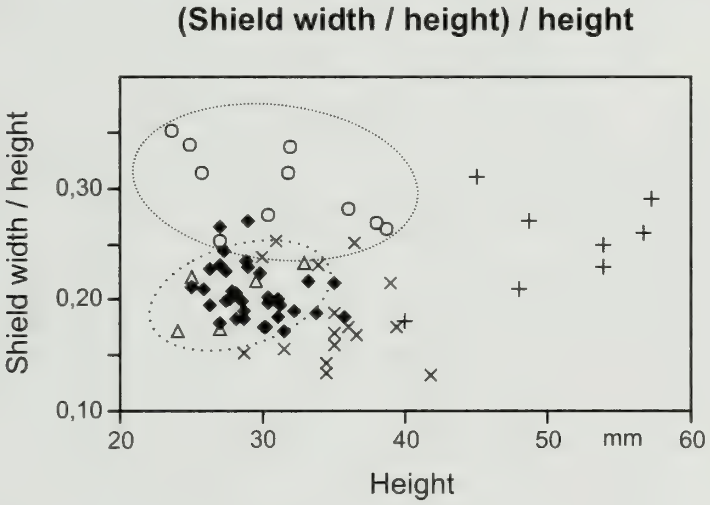

Figure 5. Morphometric plot of (shield width/height)/height. ◆ - *M. domingense*; ○ - *M. chipolanum*; △ - *M. jungi*; ✕ - *M. lindae*; + - *M. dennisoni*.

4. *M. (O.) jungi* has consistently fewer axial ribs in relation to height than *M. lindae*. Although there is some overlap, *M. (O.) domingense* also tends to have fewer ribs than *M. (O.) lindae*. *M. (O.) dennisoni* can also be separated in having fewer ribs in relation to size (Fig. 6).

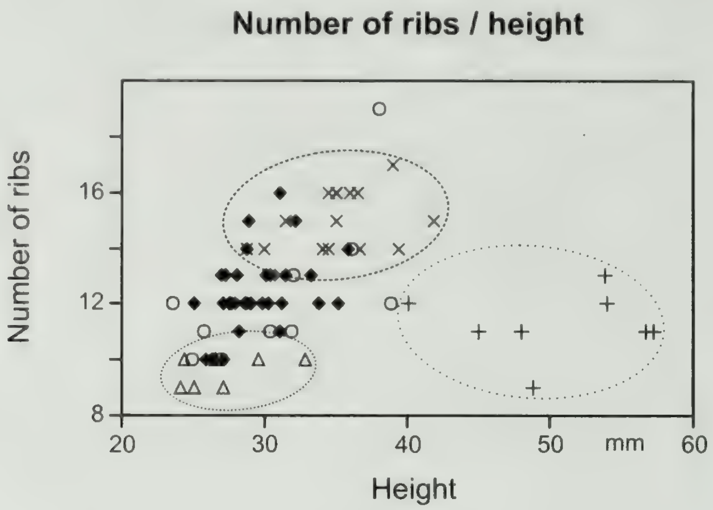

Figure 6. Morphometric plot of number of axial ribs/height. ◆ - *M. domingense*; ○ - *M. chipolanum*; △ - *M. jungi*; × - *M. lindae*; + - *M. dennisoni*.

5. *M. (O.) lindae* has consistently fewer spiral cords in relation to height than *M. (O.) chipolanum*. Although there is some overlap, *M. (O.) lindae* also tends to have fewer cords than *M. (O.) domingense* and *M. (O.) jungi* (Fig. 7).

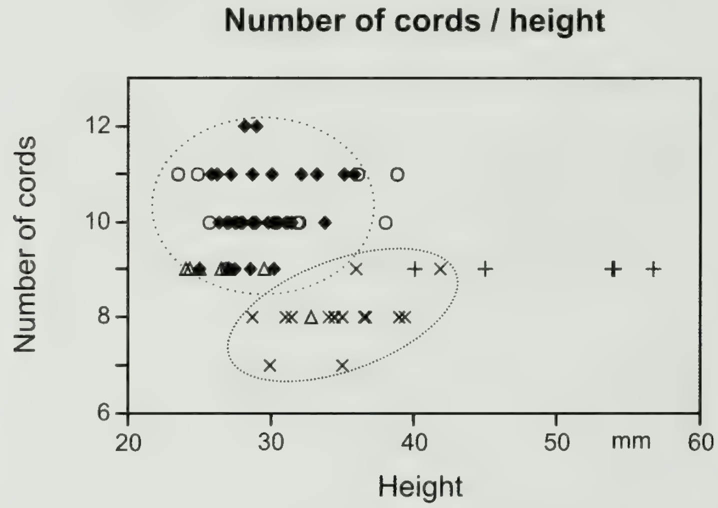

Figure 7. Morphometric plot of number of spiral cords/height. ◆ - *M. domingense*; ○ - *M. chipolanum*; △ - *M. jungi*; × - *M. lindae*; + - *M. dennisoni*.

DISCUSSION

It is clear from the results above that by this morphometric assessment alone it is not possible to distinguish groups of specimens easily within this assemblage of taxa with highly conservative shell form. Our plots show that *M. (O.) domingense* tends to have a narrower shell than *M. (O.) lindae*, *M. (O.) chipolanum* tends to have the broadest parietal shield, that *M. (O.) jungi* has consistently fewer axial ribs than *M. (O.) lindae*, and *M. (O.) lindae* has consistently fewer spiral cords than *M. (O.) chipolanum* while tending to have fewer cords than *M. (O.) domingense* and *M. (O.) jungi*.

Two further shell features are important in distinguishing the four groups of shells, which are not amenable to morphometric analysis: These are the shape of the parietal shield and the degree of development of secondary scabrous or squamous sculpture formed by the axial growth lines. *Morum*

(Oniscidia) chipolanum and *M. (O.) jungi* both have a shield which is rounded adapically, whereas in *M. (O.) domingense* and *M. (O.) lindae* the shield is somewhat pointed in the area of the posterior canal (see Plate 1). This character does not seem too variable intraspecifically.

The second, the surface scabrosity, is difficult to quantify. There is no doubt that *M. (O.) chipolanum* has the most scabrous surface and *M. (O.) domingense* the least. Whilst some intraspecific variability exists, the most scabrous specimen of *M. (O.) domingense* (Plate 1, Figure 4) is still less scabrous than the smoothest *M. (O.) chipolanum. Morum (O.) lindae* usually has a more scabrous surface than *M. (O.) domingense*, although in the occasional specimen (Plate 1, Figure 4) there is little difference between them.

Vokes (1998) discussed a further character, the spire and considered *M. (O.) lindae* to have a more stepped spire than *M. (O.) domingense*. As can be seen from the specimens illustrated (Plate 1) and the plot of (apertural height/height)/height (Figure 3) there is no difference in relative spire height between the three species and only *M. (O.) jungi* has a significantly more stepped spire, i.e. the infrasutural platform is more horizontal.

PALAEOBIOGEOGRAPHIC CONSIDERATIONS

The present Caribbean region in the Miocene and Pliocene was part of the larger palaeobiogeographical Gatunian Province, which straddled the present day region of the Isthmus of Panama and included the modern Caribbean region and Tropical American Pacific (Woodring, 1974; Vermeij, 2005). The closure of the Central American Seaway (CAS) divided the Gatunian Sea, causing a significant change in the faunal composition on the Atlantic side. After the total closure of the CAS the Atlantic portion of the Neogene Gatunian Province gave rise to the Recent Caribbean Province. The Neogene Gatunian Province is characterized by a relative stability of gastropod taxa at generic level, but a very rapid turnover at specific level (Landau *et al.*, in print PPP). These high rates of extinction and local disappearance are accompanied by high rates of speciation (Allmon *et al.*, 1993; Jackson *et al.*, 1993). At species level it is not unusual to have an extinction rate since the Early Pliocene to present times of 80-85% (Woodring, 1928; Jung, 1969, Landau *et al.*, in press), with about half the long-lived taxa belonging to the most notoriously cosmopolitan group of gastropods, the tonnoideans (Beu, in prep).

Within the Gatunian Province, *Morum (Oniscidia) domingensis* is found exclusively in the West Indian Subprovince of Woodring (1974). The northern Caribbean coasts of South America formed the Colombian-Venezuelan-Trinidad Subprovince of Woodring (1974). At specific level, the assemblages found in the West Indian and Colombian-Venezuelan-Trinidad Subprovince share very few taxa in common. Despite extensive collecting in rich Pliocene sediments in the area, there are no reported occurrences of *M. (O.) domingense* in the fossil record of the Colombian-Venezuelan-Trinidad Subprovince.

Morum (O.) lindae occurs exclusively off the Caribbean coast of Colombia and Venezuela. As in the Neogene, the fauna of the northern coasts of South America contains a high number of endemic elements (Petuch, 1987; Diaz, 1995). Indeed, Landau *et al.* (in print PPP) argued that the Colombian-Venezuelan-Trinidad Subprovince was probably in place since at least the Early Miocene and has continued as a distinct palaeobiogeographical unit to the present day. Although Petuch (1982) argued that this area had acted as a refugium for Gatunian species unchanged since the Pliocene (a primary relict pocket, according to his nomenclature), this does not stand up to taxonomic scrutiny. Petuch (1988) later considered it a secondary relict pocket, i.e. containing species which closely resemble their Pliocene ancestors. There is no fossil record of *M. (O.) lindae* in the southern Caribbean assemblages. Only one single fragment of *Morum (Oniscidia)* sp. from the Lower Pliocene Punta Gavilán Formation, Falcón Province, mainland Venezuela, is known (BL collection), and it is too incomplete to identify specifically.

CONCLUSIONS

Using a combination of quantitative shell parameters and qualitative shell characters of shield shape and scabrous surface one can conclude that *M. (O.) chipolanum* is most clearly distinguished from its congeners by the round shape of its shield and strongly scabrous surface. *Morum (O.) jungi* is characterized again by its abapically rounded shield, although less expansive than in the previous species and in having consistently fewer axial ribs than its congeners. *Morum (O.) domingense* and *M. (O.) lindae* are less easily distinguished; *M. (O.) domingense* tends to have a more elongated shell, fewer axial ribs as well as a greater number of primary spiral cords and also tends to have a smoother surface although there is some overlap with all these features between the two taxa. Apertural height, spire height and shield width are not useful to distinguish the shells of the two species.

On the basis of protoconch morphology all members of the *M. chipolanum*-group, in which the protoconch is known, have a small paucispiral protoconch, which strongly suggests a non planktotrophic larval development. This type of development is commonly associated with species having a shorter geological longevity and a more restricted geographical distribution (Jablonski & Lutz, 1980; Scheltema, 1989; Gili & Martinell, 1994), which might support the separation of the two taxa. However, this does not seem to be universally true across all gastropod groups, as Jackson *et al.* (1996) found no correlation between species longevity and inferred developmental modes in Neogene Tropical American strombinids.

Whilst *M. (O.) domingense* and *M. (O.) lindae* show very similar shells, on the basis of our present knowledge of the Caribbean faunal turnover and the biogeography of the Neogene Atlantic Gatunian faunas it would be very unlikely for an exclusively Upper Miocene-Lower Pliocene Gatunian West Indian species to occur today within the Colombian-Venezuelan-Trinidad Subprovince.

Taking all the above arguments into consideration it is most likely that *M. (O.) domingense* and *M. (O.) lindae* actually represent two distinct taxa. There is insufficient evidence to suggest a direct lineage between the two based on their shell morphology and palaeobiogeographic distribution. Further information on the *Morum (Oniscidia)* species present in the Lower Pliocene Punta Gavilán Formation of Venezuela might help to clarify the relationship between these members of the *M. chipolanum*-group in the southern Caribbean.

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Figures 8-23

8-9. *Morum (Oniscidia) chipolanum* Dall, 1925. Loc. TU 546. Chipola River, Calhoun County, Florida, USA, Lower Miocene, Chipola Formation. Height 38.6 mm (B. L. coll).

10-11. *Morum (Oniscidia) domingense* (Sowerby, 1850). Loc. TU 1219. Amina River, Dominican Republic, Lower Miocene, Chipola Formation. Height 34.9 mm (B. L. coll).

12-13. *Morum (Oniscidia) domingense* (Sowerby, 1850). Loc. TU 1215. Gurabo River, Dominican Republic, Lower Miocene, Chipola Formation. Height 35.6 mm (B. L. coll).

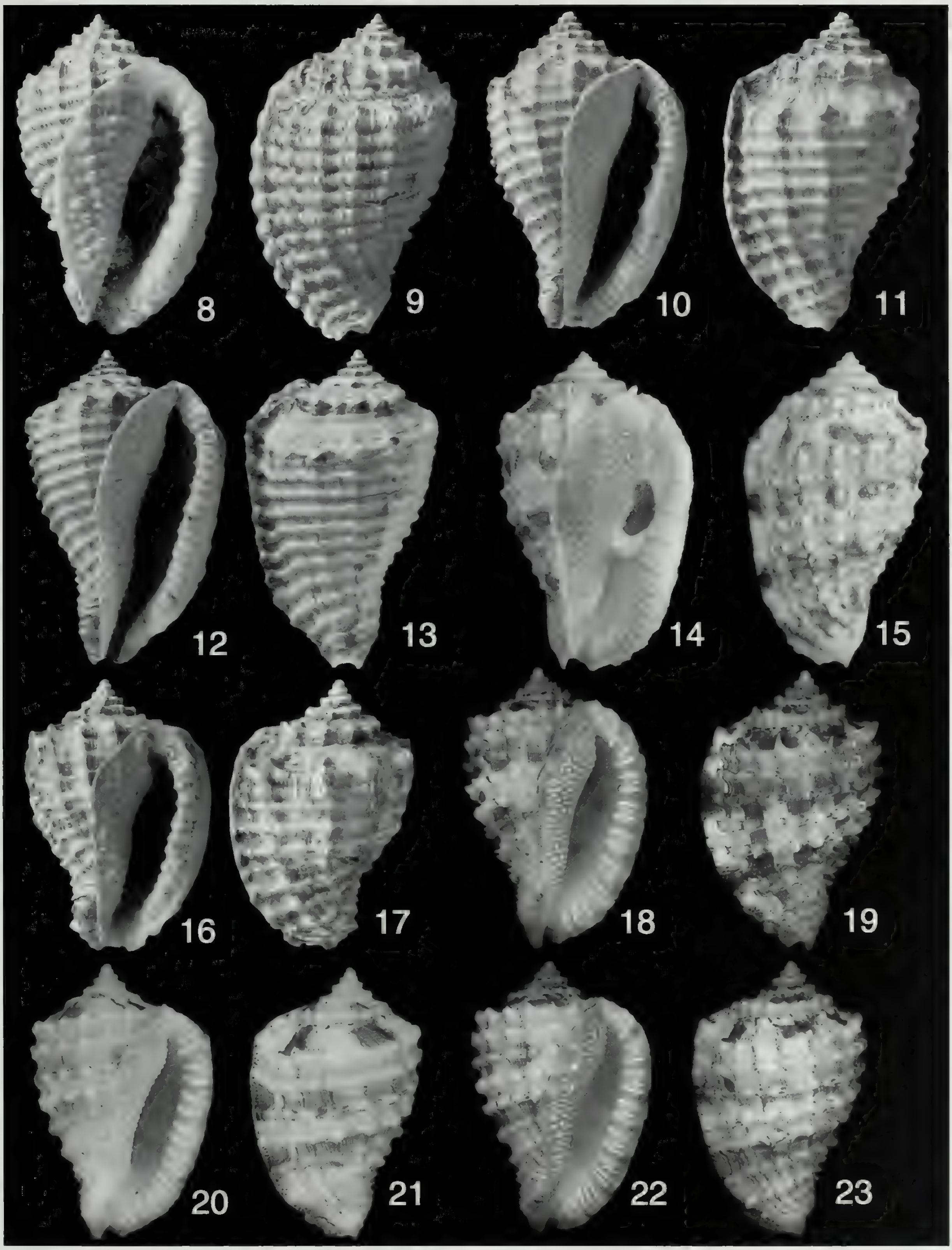
14-15. *Morum (Oniscidia) dennisoni* (Reeve, 1842). Vitoria, Espirito Santo State, Brasil, Recent. Height 48.8 mm (photo: Femorale).

16-17. *Morum (Oniscidia) jungi* Landau, 1996. Loc. TU 1269. Casa Cantaure, Paraguaná Peninsula, Falcón State, Venezuela, Lower Miocene, Cantaure Formation. Height 25.0 mm (B. L. coll).

18-19. *Morum (Oniscidia) lindae* Petuch, 1988. Cabo de la Vela, Colombia, Recent. Height 36.0 mm (photo: Femorale).

20-21. *Morum (Oniscidia) lindae* Petuch, 1988. Cabo de la Vela, Colombia, Recent. Height 31.5 mm (photo: Femorale).

22-23. *Morum (Oniscidia) lindae* Petuch, 1988. Cabo de la Vela, Colombia, Recent. Height 39.4 mm (photo: Femorale).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Description of a new *Solariella* species (Gastropoda: Trochoidea: Solariellidae) from the Azores

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KEYWORDS. Gastropoda, Trochoidea, Solariellidae, *Solariella cancapae* n. sp., Azores, central eastern Atlantic.

ABSTRACT. *Solariella cancapae* n. sp. is described from the Azores and compared with similar known species : *S. amabilis* (Jeffreys, 1865), *S. multirestis* Quinn, 1979, *S. azorensis* (Watson, 1886) and *Haloceras carinata* (Jeffreys 1883). Most of these species are illustrated.

RESUME. Une nouvelle espèce *Solariella cancapae* est décrite des Açores et comparée aux espèces connues les plus proches : *S. amabilis* (Jeffreys, 1865), *S. multirestis* Quinn, 1979, *S. azorensis* (Watson, 1886) et *Haloceras carinata* (Jeffreys 1883). La plupart de ces espèces sont illustrées.

INTRODUCTION

During about ten years (from 1976 to 1986), the Rijksmuseum van Natuurlijke Historie (National Museum of Natural History) in Leiden led the CANCAP–project, a large programme of biogeographically oriented marine research in the south–eastern part of northern Atlantic. Seven campaigns (CANCAP–I to VII) were carried out, visiting a large area covering Azores, Madeira Archipelago, the Moroccan shelf, Canary Islands, Mauritanian coasts, Senegal and the Cape Verde Islands. Van der Land (1987) listed the stations of the whole CANCAP–project. These campaigns have brought an interesting material of highly scientific interest, among others various trochids species. Some of them were *Calliotropis* species and have been studied in a more general work upon this genus in the central eastern Atlantic (Vilvens & Swinnen, in press). Other species were Solariellidae, and we found among them a specimen from the Azores that seems to be unknown. Closer examination and comparison with other species from this area lead us to conclude that this shell belong to another new species that is described here.

Abbreviations

Repositories

MHNSC: Museo de Historia Natural of Santiago de Compostela, Spain.
MNCN: Museo Nacional de Ciencias Naturales, Madrid, Spain.
MNHN: Muséum national d'Histoire naturelle, Paris, France.
BMNH: Natural History Museum, London, England.
NNML: Nationaal Natuurhistorisch Museum Leiden, The Netherlands.
ZSM: Zoologische Staatssammlung, München, Germany.

Other abbreviations

H: height
W: width
P1, P2, P3, ...: primary cords (P1 is the most adapical)
S1, S2, S3, ...: secondary cords (S1 is the most adapical)
stn: station
lv.: live–taken specimens present in sample
dd: no live–taken specimens present in sample
coll.: private collection

SYSTEMATICS

We follow here the classification of Bouchet & Rocroi (2005), where former Solariellinae, earlier treated as a subfamily of Trochidae (Hickman & McLean, 1990), are now ranked as a family of the superfamily Trochoidea.

Superfamily **TROCHOIDEA** Rafinesque, 1815
Family **SOLARIELLIDAE** Powell, 1951
(= Minoliinae Kuroda, Habe & Oyama, 1971)
Genus: ***Solariella*** Wood, 1842
Type species: *Solariella maculata* Wood, 1842 (by monotypy) – Pliocene, England.

Solariella cancapae n. sp.

Figs 1–2

Type material. Holotype (9.7 x 8.4 mm) NNML (RMNH.MOL.109036).

Type locality. Azores, east of Flores, CANCAP–V, stn 5.171, 39°20'N, 30°52'W, 1874–1887 m.

Material examined. Azores. CANCAP–V: stn 5.171, 39°20'N, 30°52'W, 1874–1887 m, 1 dd (holotype)

Distribution. Azores, east of Flores, 39°20'N, 30°52'W, 1874–1887 m.

Diagnosis. A high–spired *Solariella* species with conical shape, whitish, with 2 main spiral cords and numerous thin spiral cords on spire whorls, the adapical the strongest; abapical main cord obsolete on last whorl; base with numerous spiral cords and an inner granular cord around the broad umbilicus.

Description. *Shell* rather tall for the genus (height up to 9.7 mm, width up to 8.4 mm), higher than wide, rather thin, conical; spire high, height 1.15x width, 3.6x aperture height; wide umbilicus.

Protoconch of 400 µm, of 1 whorl, smooth, without visible terminal varix.

Teleoconch up to 5.7 convex whorls, bearing up to 20 spiral granular cords and thin prosocline ribs; nodules from cords produced by intersections with axial threads. Suture impressed, slightly canaliculated. First whorl convex, immediately sculptured by 6 thin, evenly spaced spiral cords; P1 granular, P2 and P3 subgranular, P4, P5 and P6 smooth; half a whorl later, P2 and P3 granular and P4 subgranular; weak, almost indistinct, axial thin ribs; ribs stronger at end of whorl, thicker in their adapical part; interspace between ribs 3x broader than ribs. On second whorl, all spiral cords granular; P1 stronger than other cords, with thick beads; P6 sinking into suture and disappearing; secondary cords S1 and S4 appearing. On third whorl, P1 strongest, producing subsutural horizontal ramp, with beads becoming sharp, oriented at 75°; P4 weaker than P1 but stronger than other cords, producing a second keel at second third of whorl; axial ribs visible all around the whorl, prosocline, thicker than on preceding whorl, interspace between ribs about 2x broader than ribs. On succeeding whorls, additional thin spiral cords appearing by intercalation between existing cords, more visible between P4 and P6; axial ribs still rather thick above P4, much thinner under it; subsutural ramp becoming oblique. On last whorl, all spiral cords weak except P1 strong with sharp, isolated nodules; cords hard to count, about 20; keel at P4 disappearing.

Aperture circular; peristome almost complete; outer and inner lip rather thin. Columella curved, with a weak median thickening, without tooth.

Base moderately convex, with about 10 spiral cords, innermost much stronger, with sharp beads, bordering umbilicus; distance between cords similar in size to cords; thin axial ribs between cords, thinner than cords, distance between from 1x to 1.5x size of ribs.

Umbilicus broad, diameter about 30% of shell width, funnel shaped with gently sloping walls, with about 8 thin, granular spiral cords and thin axial lamellae inside.

Colour of protoconch and teleoconch off–white.

Discussion. *Solariella cancapae* n. sp. is rather close to *S. amabilis* (Jeffreys, 1865) (Figs 7–12) from North–western European Atlantic [(from Iceland and Norwegian to off Morocco (Sneli et al., 2005)], but this species, rather variable regarding the height of the shell but never recorded from the Azores, is much smaller, has three, not only one, strong spiral cords making keels on last whorl, much thinner, indistinct spiral cords on the base with an innermost much thicker spiral cord around the umbilicus, and less numerous spiral cords (up to 5) inside the umbilicus.

The combination of an elevated shell, a strong spiral cord P1 with sharp beads and a prominent second keel on spire whorls may remember *S. multirestis* Quinn, 1979 from Lesser Antilles and Florida Keys, but this similar in size species has the main spiral cords of same strength, no keel at second third of the spire whorls and stronger, only 7, spiral cords on the base (see Quinn, 1979 for an illustration).

Figures 1-14 (Scale bars: Figs 1-6 = 5 mm; Figs 7-12 = 1 mm; Figs 13-14 = 2 mm)

1–2. *Solariella cancapae* n. sp., Azores, holotype NNML (RMNH.MOL.109036), 1874–1887 m (CANCAP–V, stn 5.171), 9.7 x 8.4 mm.

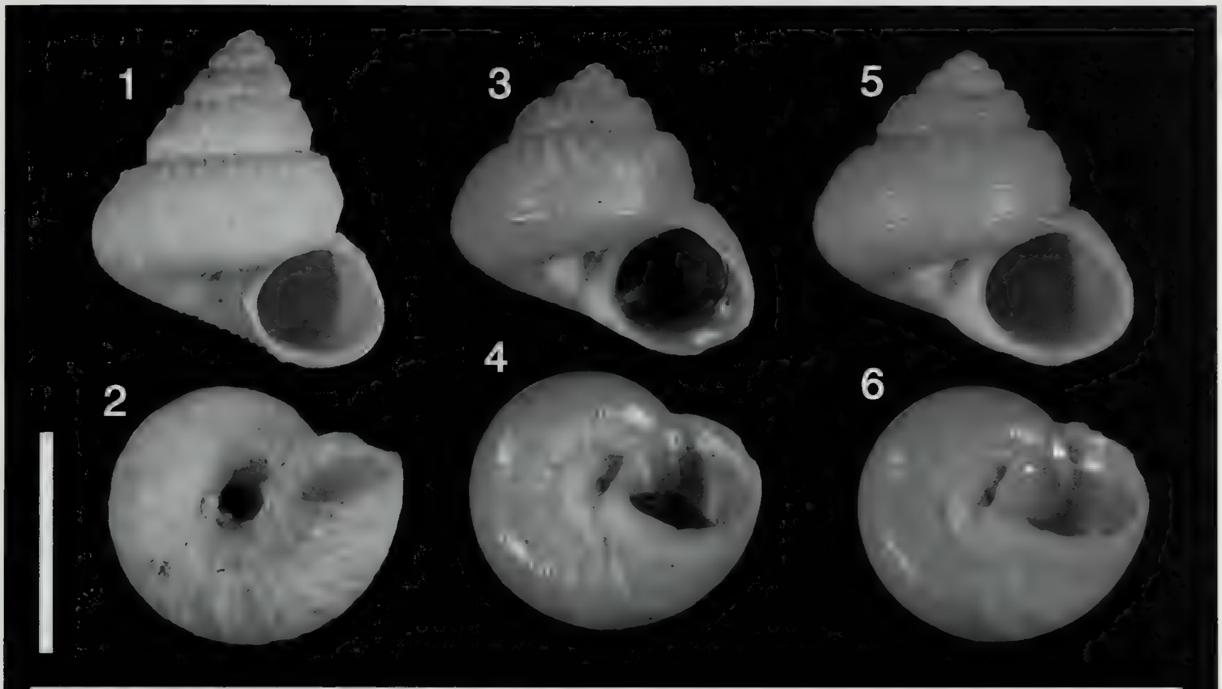
3–6. *Ethalia azorensis* (Watson, 1886).

3–4. Holotype BMNH (1887.2.9.332), Azores, 823 m (CHALLENGER, stn 75), 8.1 x 8.4 mm; **5–6.** NNML, Azores, 250 m (CANCAP–V, stn 5.121), 9.3 x 9.3 mm.

7–12. *Solariella amabilis* (Jeffreys, 1865).

7–10. MNCN, golfe of Huelva, 585–546 m. **7–8.** 3.3 x 3.3 mm; **9–10.** 2.4 x 2.6 mm. **11–12.** Cadiz, NNML, 2.3 x 2.7 mm.

13–14. *Haloceras carinata* (Jeffreys 1883), Madeira, Ilheu de Buglio, Ihlas desertas, 140–160 m, B.Van Heugten coll., 6.6 x 6.3 mm.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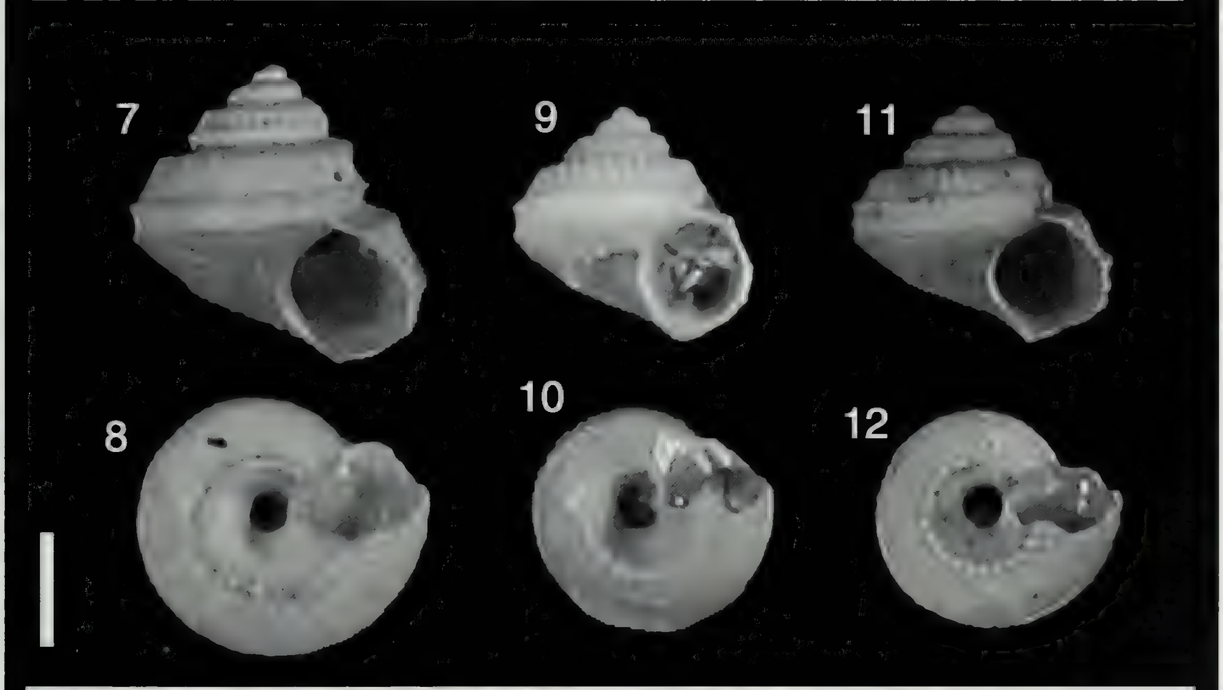
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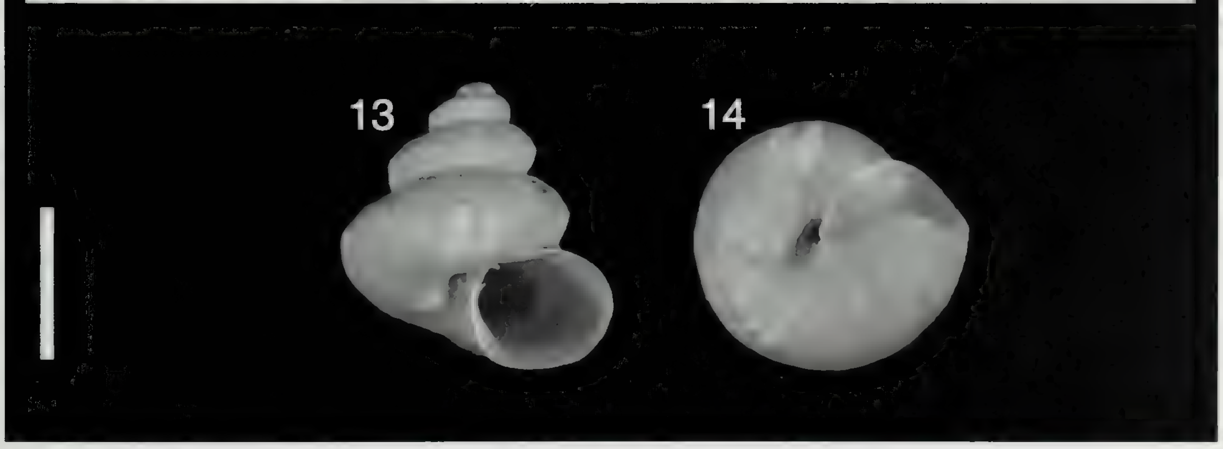
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From the same Azores area, the new species may also be compared to *S. azorensis* (Watson, 1886) (Figs 3–6), but this similar in size species has a less elevated spire with a ratio H/W about 1, adapical granular spiral cords on whorls aligned along prosocline axial ribs and abapical ones smooth on last whorl, and a thick funicle partly filling the umbilicus (this feature lead us to think that this species could be moved from the genus *Solariella* to the genus *Ethalia* Adams & Adams, 1854, or related *Rossiteria* Brazier, 1895).
S. cancapae n. sp. is also superficially similar to *Haloceras carinata* (Jeffreys 1883) (Vanikoroidea) (Figs 13–14), former known as *S. constricta* Dall, 1927 and *Cithna carinata* Jeffreys, 1883 (Waren & Bouchet, 1991 and 1993) from northern Atlantic (from southern Georgia to southern Florida and from off Portugal to Madeira), but this much smaller species has more convex whorls, a thinner subsutural beaded spiral cord if present, and a much narrower umbilicus.

Etymology. Of CANCAP (Latin) – after the CANCAP campaigns that brought this species to our knowledge.

ACKNOWLEDGEMENTS

We would like to thank P. Bouchet (Muséum national d'Histoire naturelle, Paris) for reading the manuscript, giving advice and access to the malacological resources of the MNHN. We also warmly thank V. Héros (MNHN) for her dynamic help in our search of types and various scientific papers.
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Three new deep-water species of mollusks (Gastropoda: Calliostomatidae, Cystiscidae) from the southeastern Gulf of Mexico

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KEYWORDS. Gastropoda, Calliostomatidae, *Calliostoma*, Cystiscidae, *Canalispira*, Florida, Yucatán, Gulf of Mexico, deep-water.

ABSTRACT. Three new gastropod species from deep-water, southeastern Gulf of Mexico are described: *Calliostoma frumari* in the family Calliostomatidae; and *Canalispira kerni* and *C. lipei* in the family Cystiscidae. They are compared with their congeners.

INTRODUCTION

Deep-water dredgings in the Gulf of Mexico have brought to light a number of new species of small cryptic mollusks that have been described in recent years. While these species were collected due to the availability of grants and research ships, amateur collectors have also been doing their part with perhaps less sophisticated methods, such as making fishermen aware of the smaller, less marketable species, or by the collector himself, who spends time and money to go after the deeper-water material.

Two of the new species treated in this study, *Calliostoma frumari* and *Canalispira kerni* are the result of private deep-water dredging operations off the southwestern coast of Key West, Florida by Frank Frumar, an ardent shell collector and dredging enthusiast, and Steve Kern, a commercial lobster fisherman from Key West, Florida, owner of the dredging boat. Specimens of the third species, *Canalispira lipei*, were obtained by Robert Lipe, of St. Petersburg, Florida by contacting fishermen who operated in the Yucatán area.

The genus *Canalispira* was poorly understood by the malacological community until Coovert & Coovert (1995) published their monograph on marginelliform gastropods. The genus was further readdressed by McCleery & Wakefield (2007) when the authors also described three new species. Until recently only two western Atlantic species had been assigned to *Canalispira*: *Hyalina styria* var. *minor* Dall, 1927, inhabiting deep water off Georgia and northeastern Florida, and *Prunum hoffi* Moolenbeek & Faber 1991, found in the island of Saba, Netherland Antilles. Since then, five new species of *Canalispira* have been described: the Cuban species *Osvaldoginella gomezi* Espinosa and Ortea, 1997: 141-145, later placed in *Canalispira* by McCleery and Wakefield (2007: 2); *C. aurea* García, 2006, dredged in Bahía de Campeche, Mexico; and the Central American species *C. phantasia* McCleery & Wakefield, 2007, *C. ornata* McCleery & Wakefield, 2007, and *C. fluctuata* McCleery & Wakefield, 2007. Canalispira *kerni* n. sp. is only the second species assigned to this genus to be found in the United States. The second *Canalispira* described here, *C. lipei*, has originally appeared in publications as "*Volvarina*" sp. (Lipe & Sunderland, 1991:15), and "*Marginella*" sp. (Lipe, 1991: 14, pl. 7, figs 8 and 9; and back cover). In both publications the stated locality is "Florida". However, this is in error (Robert Lipe, pers. comm.), as the confirmed locality for the species is off Contoy Light, northeastern Yucatán Peninsula, Mexico. The corrected locality appears in an errata sheet sent by Mr. Lipe with later copies of his booklet *Marginellas*.

The genus *Calliostoma* has not seen the surge of publications that *Canalispira* has received. Since Quinn's publication in 1992 in which he described 27 new species of western Atlantic *Calliostoma sensu lato*, only *Calliostoma magaldii* Caldini & Prado, 1998, a species from Chubut Province, Argentina, has been described. Presumably, the new species proposed here may have been overlooked because of its small size and deep-water habitat.

Abbreviations

ANSP: Academy of Natural Sciences, Philadelphia, Pennsylvania, U.S.A.
EFG: author's collection
USNM: National Museum of Natural History, Smithsonian Institution, Washington, DC, USA.

SYSTEMATICS

Superfamily **TROCHOIDEA** Rafinesque, 1815
Family **CALLIOSTOMATIDAE** Thiele, 1924
Subfamily **CALLIOSTOMATINAE** Thiele, 1924
Tribe **Calliostomatini** Thiele, 1924
Genus ***Calliostoma*** Swainson, 1840
Type species *Trochus conulus* Linnaeus, 1758 (by subsequent designation Herrmannsen, 1846).

Calliostoma frumari n. sp.
Figs 1-4

Type material. Holotype ANSP 416230 width 7.7 mm, height 5.8 mm (Figs 1-4), 1 paratype EFG 28090;1 paratype USNM 1106892; 1 paratype Frank Frumar coll. , 1 paratype Steve Kern coll.

Type locality. 24°14'N, 82°09'W; approximately 37 kms southwest of KeyWest, Florida, in 200 m.

Distribution. Known only from the type locality

Description. Holotype 7.7 mm in width (Figs 1-4), light in weight, strong, widely umbilicate, widely trochoid (width/ height ratio 0.75). Protoconch translucent white, smooth, of about one whorl. Teleoconch of 6 whorls; first whorl with carinated shoulder; shoulder narrowing on second whorl, disappearing on later whorls; profile of whorls slightly convex in early whorls, becoming progressively straight. Suture channeled, bordered on both sides by rows of bead. Axial sculpture appearing immediately after termination of protoconch; about 29 slightly nodulose axial threads on first whorl; nodes becoming stronger, forming well-defined rounded beads on following whorls; axial ornamentation increasing in number on later whorls; approximately 62 axially aligned rows of beads on last whorl. First spiral pattern showing as nodulose carina on first whorl; a second abapical thread appearing towards end of first whorl; three adapical axial nodes showing obvious spiral alignment by middle of second whorl; second whorl terminating with 5, evenly spaced spiral rows of beads; number of rows remaining constant on following 3 whorls; rows increasing incrementally in size abapically; sixth narrower cord appearing abapically on last whorl, creating slight carina at base of shell; a thin spiral thread appearing between fourth and fifth cord; all shell beads connected by spiral thread only. Base of shell only slightly convex at border, becoming concave approximately mid-way to umbilical area (Fig 2), ornamented with 9 spiral cords; peripheral cords slightly nodulose, nodes increasing in strength on subsequent cords. Periphery of umbilicus delineated by a wide, strong cord of axially elongated beads (Fig. 3); umbilicus wide, 24% of maximum shell diameter, smooth within, funnel-shaped, deep, reaching apical whorl. Aperture sub-quadrate; lip thin; columella with one prominent denticle at periphery of umbilicus and a second, smaller denticle slightly posterior to elongated umbilical beads (fig. 3). Shell nacreous.

Discussion. Marshall (1995: 385) established the value of the development of early spiral ornamentation in Calliostomatidae in discriminating species-group taxa. The ontogeny of spiral elements in *Calliostoma frumari* have been carefully described above. The new species has 5 primary cords from second to fifth whorls, with a sixth primary cord at the periphery of the last whorl. The thin thread showing between the fourth and fifth spiral cords on the last whorl is not consistent with ornamentation of the paratypes and seems to be of sub-specific value.

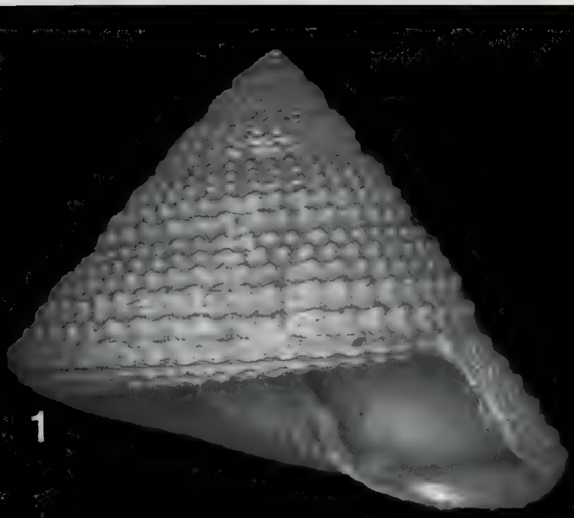
The nacreous shell, widely trochoid shape, and large umbilicus separate this species from other western Atlantic *Calliostoma.* Two American species are somewhat similar. *Calliostoma aulicum* Quinn, 1992, a species from the Caribbean coast of Panama, has a narrower umbilicus (17%- 20% of maximum shell diameter), grows to 16.1 mm in width, has different markings, and a spiral ornamentation of 2 to 3spiral cords on first two whorls, increasing to 10 to 12 on last, abapical three strongest. *Calliostoma argentum* Quinn, 1992, which inhabits Yucatán waters, also has a narrower umbilicus (14%- 17% of maximum shell diameter), grows to 28.2 mm, has a light tan shell with pale orange-brown patches and spots on periphery, and a spiral sculpture of 2 to 3 spiral cords on first two whorls, increasing to 9 to 11 on last whorl.

The widely trochoid profile, the nacreous shell, the strong denticles in the aperture, and large umbilicus of *Calliostoma frumari* have strong similarity to characters of *Ancistrobasis costulata* (Watson, 1859), and *A. depressa* (Dall, 1889) species inhabiting the Florida Straits and the Yucatán Channel. *A. costulata* grows to only 3.6 mm and has a more globose shell. *A. depressa* grows to 5 mm and has a width/ length ratio of 0.5. Both species have approximately twice as many spiral cords on whorls and have been assigned to Seguenziidae (Quinn, 1979: 50).

Etymology. Named for Mr. Frank Frumar, of Kirkwood, Missouri who, together with Steve Kern, collected the shells and donated the type material.

Figures 1-8

1-4. *Calliostoma frumari* n. sp. Florida. 24°14'N, 82°02'W; approximately 37 kms southwest of KeyWest, 200 m. Holotype ANSP 416230, width 7.7 mm, height 5.8 mm. **5-8.** *Canalispira kerni* n. sp. Florida. 24°14'N, 82°02'W; approximately 37 kms southwest of KeyWest, 200 m. **5-7.** Holotype ANSP 416231, length 5.1 mm, width 2.1 mm. **8.** Paratype USNM 1106893, length 5.0 mm, width 2.1 mm.



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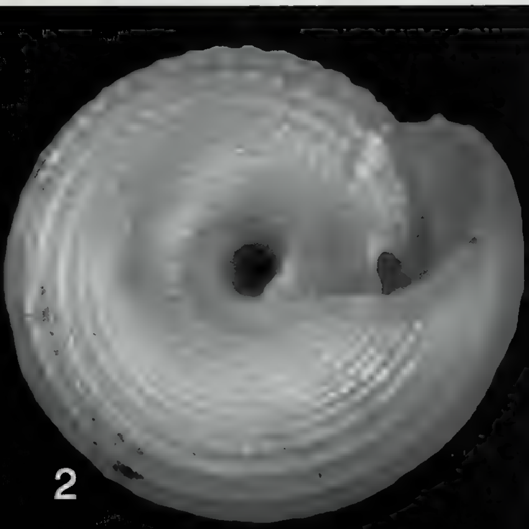

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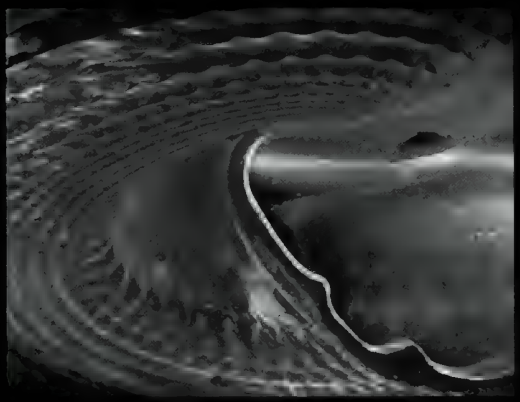

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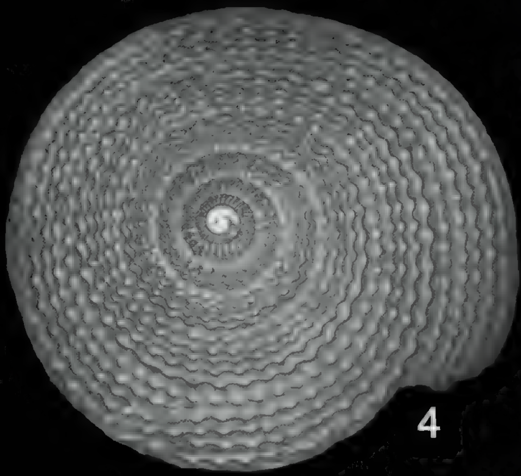

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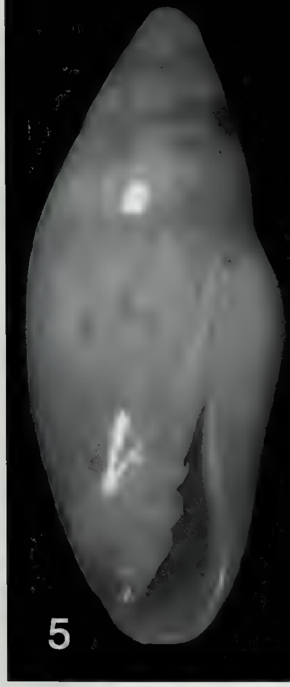

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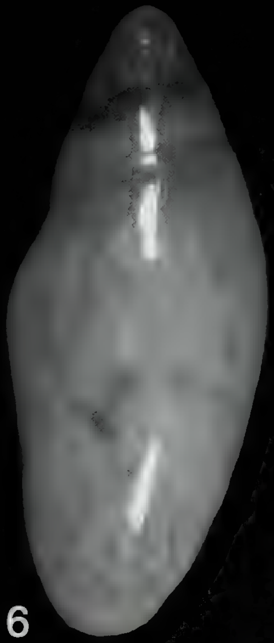

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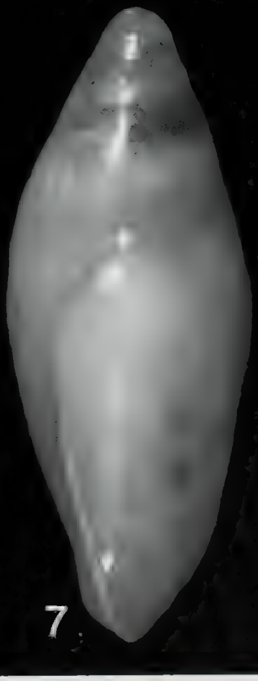

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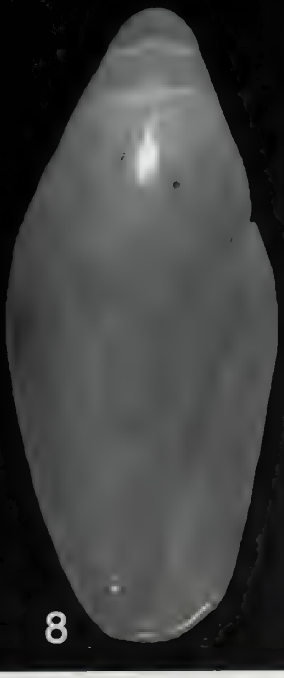

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Superfamily **MURICOIDEA** Rafinesque, 1815
Family **CYSTISCIDAE** Stimpson, 1865
Subfamily **PERSICULINAE** Coovert & Coovert, 1995: 70
Genus ***Canalispira*** Jousseaume, 1875
Type species: *C. olivellaeformis* Jousseaume, 1875; original designation

Canalispira kerni n. sp.
Figs 5-9

Type material. Holotype ANSP 416231 length 5.1 mm, width 2.1 mm (Figs 5-7, 9), 1 paratype USNM 1106893 (Fig. 8); 1 paratype EFG 28089; 3 paratypes Frank Frumar coll., 1 paratype Steve Kern coll.

Type locality. 24°14'N, 82°09'W; approximately 37 kms southwest of Key West, Florida, 200 m.

Distribution. Known only from the type locality

Description. Holotype 5.1 mm in length (Figs 5-7, 9); shell strong, smooth, highly polished, cylindrical-biconic (width/ length ratio 0.41). Spire 1.84 mm in length (36% of shell length). Protoconch dome-shaped, translucent white, of approximately one whorl, covered by glaze. Teleoconch of approximately 3.25 whorls; early whorls almost straight-sided; last whorl slightly swollen adaperturally at shoulder (Fig 6). Suture adpressed, barely discernible through an over-glaze. Aperture elongate, 3.26 mm in length (64% of shell length), with deep, narrow posterior notch; posterior half of aperture narrow, expanding anteriorly, more so starting at middle of aperture, reaching near twice the mid- apertural width at anterior end (Fig. 9). Outer lip without exterior varix, smooth within, thickened posteriorly, becoming thinner as aperture expands; outer edge slightly incurved at middle. Parietal callus wash thin, narrow posteriorly, widely expanding anteriorly starting at level of first columellar plication. Anterior half of columella with three evenly- spaced plications of almost equal strength (Fig. 9); anterior plication extending over callused area. Shell ivory; surface marked with irregularly distributed, axially- oriented, yellowish flammules; flammules covering from suture to anterior end; somewhat larger maculations appearing at mid-body, insinuating formation of a band.

Discussion. The six paratypes of the new species conform in characters with those of the holotype; however, the yellowish markings are difficult to see in some specimens due to fading.

Of the seven western Atlantic species assigned to *Canalispira*, *C. kerni* n. sp. is most similar to *Canalispira minor* (Dall, 1927) (Figs 10-12), a species inhabiting deep water off the east coast of the United States; however, the latter is smaller, relatively wider (width/ length ratio 0.43), lacks the swollen area at the shoulder of the last whorl (Fig 11), and is solid white. The "numerous specimens" inspected by Dall are "very uniform in character"(1927:46). Dall's specimens were collected in more than twice the depth of *Canalispira kerni*. Although Dall (1927: 46) and Kaicher (card No. 6204) establish the length of the syntype (USNM 107982, Figs 10-12) as 6 mm, the SEM image of the syntype shows a length of 4.6 mm.

The Central American species *Canalispira phantasia* McCleery & Wakefield, 2007, *C. ornata* McCleery & Wakefield, 2007, and *C. fluctuata* McCleery & Wakefield, 2007 live in shallow water (1– 15 m), grow to less than 4 mm in length, have four columellar plications, have a width/ length ratio of 0.47 to 0.50, and are differently marked. *Canalispira gomezi* (Espinosa & Ortea, 1997), a relatively deep-water species from northern Cuba, grows to 3 mm, has a shorter apex, and is differently marked. *Canalispira hoffi* (Moolenbeek & Faber 1991) from Saba, Dutch West Indies, grows to 3.6 mm, has 4 columellar plication, is proportionately wider, and has different markings. *Canalispira aurea* García, 2006 from Bahía de Campeche, southwestern Gulf of Mexico, is proportionately wider, has a shorter spire, four columellar plications, and is differently colored.

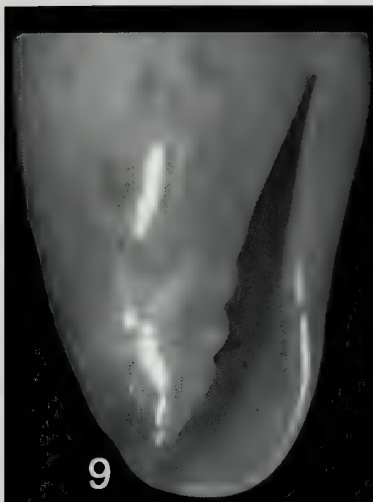
Two species of *Dentimargo* may be confused with *Canalispira kerni* because of their cylindrical- biconic shape and small size: *Dentimargo idiochila* (Schwengel, 1942), a Floridian species, has four large columellar plications and a solid coloration with a white subsutural band; and *Dentimargo smithii* (A. E. Verrill, 1885) also has four columellar plications, is brownish in color, and is proportionately wider. Moreover, these two taxa lack the deeply channeled posterior sulcus characteristic of *Canalispira*.

There is a Floridian *Volvarina*, *V. redfieldii* (Tryon, 1882) that resembles the new species, but the former grows to 8 mm, has four columellar plications, and has a solid coloration.

Etymology. Name for Mr. Steve Kern, of Key West, Florida, who, together with Frank Frumar, collected the shells and donated the type material.

Figures 9-20

9. *Canalispira kerni* n. sp., apertural view **10-12**. *Canalispira minor* (Dall, 1927), Albatross sta. 2668, off Georgia, 30°58'N, 79°38'W, 538 m. Syntype USNM 107982, length 4.6 mm, width 2 mm. **13-20.** *Canalispira lipei* n. sp. Mexico. ENE of Contoy Light, northeastern Yucatán Peninsula, 100-130 m. **13-17.** Holotype ANSP 416232, length 6.2 mm, width 2.7 mm. **18.** Paratype 1 EFG 28088, length 5.9 mm, width 2.7 mm. **19.** Paratype USNM 1106894, length 6.1 mm, width 2.7 mm. **20.** Paratype 7, Robert Lipe coll., length 5.4 mm, width 2.8 mm.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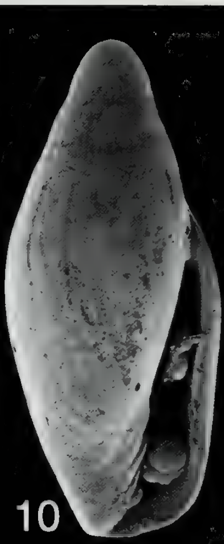
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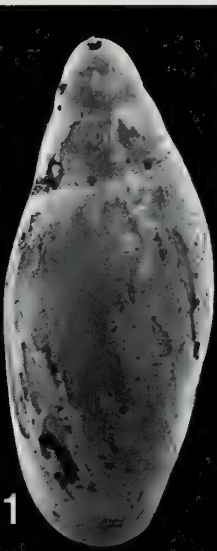
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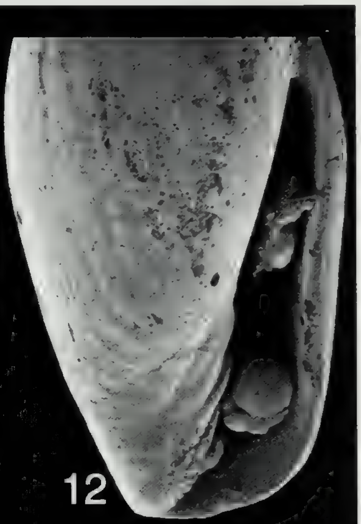
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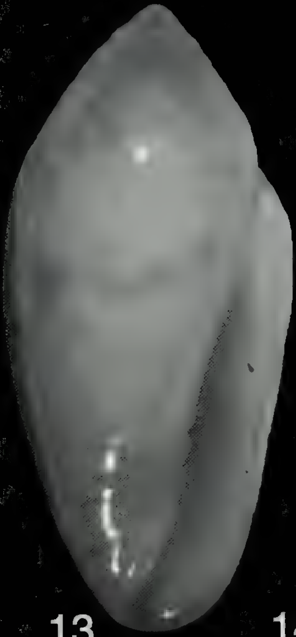
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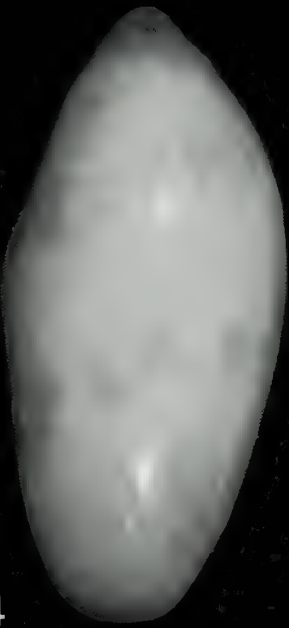
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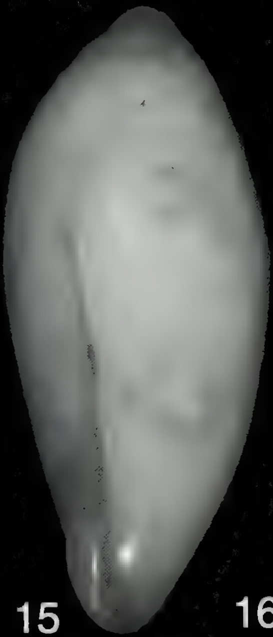
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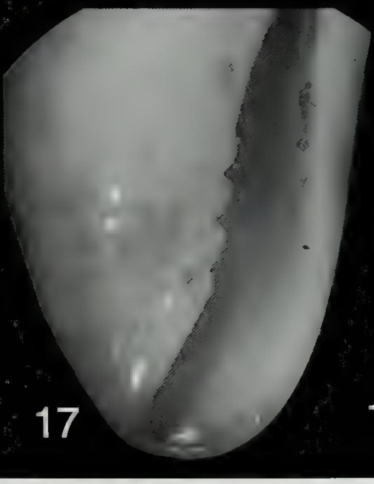
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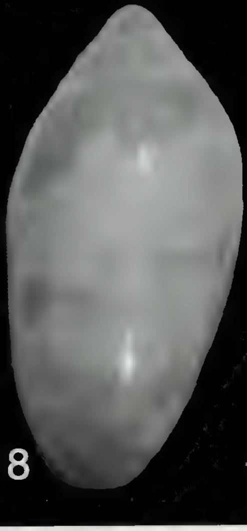
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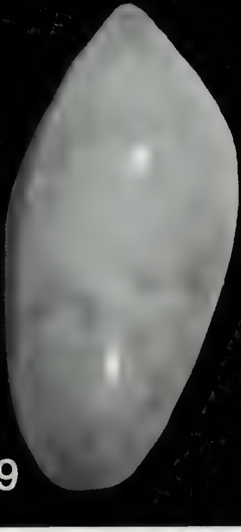
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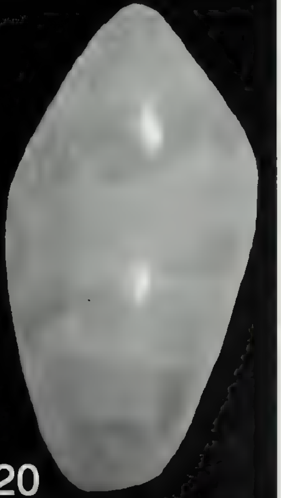
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Canalispira lipei n. sp
Figs 13-20

Type material. Holotype ANSP 416232 length 6.2 mm, width 2.7 mm (Figs 13-17), 1 paratype (paratype 1, Fig 18) EFG 28088, 1 paratype (paratype 2, Fig 19) USNM 1106894; 5 paratypes (paratypes 4-7; paratype 7, Fig 20) Robert Lipe coll, 3 paratypes (paratypes 9-11) Phillip Clover coll.

Type locality. ENE of Contoy Light, northeastern Yucatán Peninsula, E. Mexico, 75-130 m.

Distribution. Known only from the type locality

Description. Holotype 6.2 mm in length (Figs 13-17), thick, shiny, conically oblong (width/ length ratio 0.35), slightly depressed dorso-ventrally (2.7 mm in width vs. 2.5 mm in height). Protoconch paucispiral, dome-shaped, ivory white. Teleoconch ivory white, ornamented with a yellowish-orange webbing pattern, sometimes creating triangular shapes with angle pointed adaperturally, and irregular, larger maculations that tend to form bands at shoulder and at mid-body (Fig 16). Aperture ivory white, tinged with yellowish-orange at tip of anterior notch (Fig 17), approximately two thirds of shell length, narrow posteriorly, conspicuously widening after midsection. Outer lip without varix, slightly thickened posteriorly, thinning as aperture expands, slightly incurved at midsection; posterior notch deep, narrow. Columella with 4 simple, evenly spaced, oblique plications (Fig 17); first plication slightly weaker, positioned about midsection on parietal wall; anterior plication longest, continuing to, and blending into, anterior end of aperture.

Discussion. The pattern of maculation of each of the 11 specimens studied is different (Figs 18-20); however, all other characters of the holotype are present in the paratypes. Their average length is 5.76 mm; the smallest, paratype 7 (Fig 20),measures 5.4 mm; the largest, paratype 9, measures 6.6 mm. Their width is rather consistent at approximately 2.7 to 2.8 mm.

Of the 7 western Atlantic species assigned to *Canalispira*, the new species has the most affinity with *C. aurea* García, 2006, a species that inhabits Bahía de Campeche, southwestern Gulf of Mexico; however, the latter is solid orange in coloration with a thin white band by the suture, is smaller, is generally wider (width/ length ratio 0.52) and has differently structured columellar plications. *Canalispira hoffi* (Moolenbeck & Faber, 1991) grows to only 3.6 mm, is wider (width/ length ratio 0.5), has brown-tented markings, and apertural denticles. *Canalispira phantasia* McCleery & Wakefield, 2007, *C. ornata* McCleery & Wakefield, 2007, and *C. fluctuata* McCleery & Wakefield, 2007 live in shallow water (1– 15 m), grow to less that 4 mm in length, and are differently marked.

Etymology. Named for Robert Lipe, of St. Petersburg, Florida, a marginelliform enthusiast, author of the booklet *Marginellas*, and donor of the holotype and two paraypes.

ACKNOWLEDGMENTS

My thanks to Frank Frumar, Steve Kern and Robert Lipe for allowing me to study their specimens, and for donating some of the type material. My thanks also to Phillip Clover and Andrew Wakefield for allowing me to inspect three other specimens of *Canalispira lipei*. Mr. Wakefield and Claude Vilvens reviewed the sections on Cystiscidae and Calliostomatidae respectively, suggesting changes that improved its quality. Tyjuana Nickens at USNM was instrumental in obtaining the photos of the syntype of *Canalispira minor*; the photos of that species are credited to Yolanda Villacampa, also at USNM.

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Les auteurs devront suivre strictement les règles du *Code de Nomenclature Zoologique* (quatrième édition).

Manuscrits. Les manuscrits seront rédigés en français ou en anglais. Ils doivent être dactylographiés, justifiés à gauche, avec double interligne, sur une seule face de papier A4 et sur une colonne. Les marges doivent être de 25 mm minimum. La séquence des sections respectera l'ordre suivant : titre, nom de(s) auteur(s), adresse(s) de(s) auteur(s), mots-clés et résumé en anglais (et éventuellement en français). Les noms de genre et des (sous) espèces seront en caractères *italiques*. Les références dans le texte auront la forme. Keen & Campbell (1964) ou (Keen & Campbell, 1964). **Consultez un numéro récent de Novapex pour l'organisation du texte.**

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Powell, A.W.B. 1979. *New Zealand Mollusca. Marine, land and freshwater shells*. William Collins Publishers Ltd: xiv + 500 pp
Mayr, E. 1989. Attaching names to objects. In: *What the philosophy of biology is : essays for David Hull* (M. Ruse, ed.). Klumer Academic, Dordrecht: 235-243.

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Mayr, E. 1989. Attaching names to objects. In. *What the philosophy of biology is : essays for David Hull* (M Ruse, ed.). Klumer Academic, Dordrecht: 235-243.

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Vie de la Société – Life of the Society

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Mollusks

VIE DE LA SOCIETE LIFE OF THE SOCIETY

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Prochaines activités de la SBM

Claude VILVENS

Lieu de réunion : Médiathèque de l'Institut St Joseph - Rue Félix Hap 14 - 1040 Bruxelles **à partir de 14h**. *Sonnez et l'on vous ouvrira !*

ATTENTION ! *Nos activités peuvent nous emmener dans diverses salles (particulièrement pour des projections ou des montages audio-visuels). Il ne nous est donc plus possible d'ouvrir les portes à distance après 15H.*

SAMEDI 13 OCTOBRE 2007

Marc Alexandre: L'héliciculture

Après de nombreuses visites dans plusieurs parcs d'élevages et fort de son expérience personnelle, Marc a décidé de vous emmener à la découverte de curieuses fermes où le bétail se compte par milliers et dort sous des tuiles ou des planches. Allons ensemble découvrir l'"héliciculture" c'est-à-dire l'élevage d'escargots.

***

SAMEDI 10 NOVEMBRE 2007

Christiane Delongueville et Roland Scaillet: Incursion au Groenland

Deux régions seulement sont accessibles le long des 2.600 km de côtes de l'est du Groenland. L'une d'elles, Ammassalik (Tasiilaq), se situe à la hauteur de l'Islande, on la rejoint par avion au départ de Reykjavik. Un aperçu géographique, culturel et malacologique des environs sera illustré.

***

SAMEDI 15 DECEMBRE 2007

Atelier collectif : Les documentaires télévisés sur les Mollusques à destination du grand public

Nous aurons l'occasion de visionner divers films documentaires sur les Mollusques, documentaires qui ont été proposés sur la RTBF (émission "Le Jardin extraordinaire") et sur France3 (émission "C'est pas Sorcier"). Nous pourrons porter sur chacun d'entre eux appréciations et critiques – en plus du plaisir de visionner ces travaux de grande qualité. Sujets prévus : Mollusques en général, Gastéropodes, Céphalopodes et Huîtres.

***

Réservez déjà dans vos agendas les 12 janvier 2008 (exposition par les membres de la SBM), 16 février (assemblée générale de la SBM) et 8 mars.

Pour les informations de dernière minute :

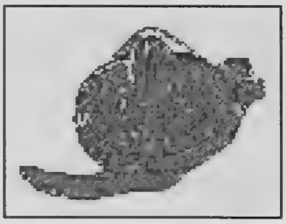
http://users.swing.be/sw216502/ ou http://www.sbm.be.tf

Tous les articles généraux sont les bienvenus pour Novapex/Société ☺ !

Afin de faciliter le travail de la Rédaction, il est vivement (et le mot est faible ;-)) souhaité de respecter les règles suivantes pour les articles proposés :

- document MS-Word (pour PC Windows 2000 ou XP);
- police de caractères Times New Roman;
- texte de taille 10, titres de taille 12;
- interligne simple;
- toutes les marges à 2,5 cm;
- document en une seule section;
- pas de mode colonne;
- photos en version électronique JPG.

Merci pour les Scribes ;-) !



Note sur la présence de *Mercenaria mercenaria* Linnaeus, 1758 en baie du Mont-Saint-Michel (France)

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Mercenaria mercenaria Linnaeus, 1758 est un Veneridae originaire de la Côte Est de l'Amérique du Nord. Il est présent de la Nouvelle-Ecosse (Canada) jusqu'au Yucatan (Mexique). Dans certaines régions, il est commercialement exploité pour la consommation de sa chair. L'espèce a été introduite dans certains estuaires des côtes européennes à des fins d'élevage. Les tentatives de conchyliculture n'ont jamais fait l'objet d'un succès particulier, cependant quelques populations implantées sont recensées en Angleterre (Solent), aux Pays-Bas (Zélande) et en Belgique (Port d'Oostende) (Tebble 1966). En France, sur la façade atlantique, des populations sont présentes dans le golfe du Morbihan (Rivières du Bono et d'Aurey) et en Charente-Maritime (estuaire de la Seudre) sur des fonds sablo-vaseux, jusqu'à quinze mètres de profondeur (Ifremer 2007). On signale aussi la présence de l'espèce au Portugal, en Espagne (Atlantique), en Adriatique septentrionale et en Sicile (Quéro & Wayne 1998).

Un spécimen vivant de *Mercenaria mercenaria* a été trouvé dans les résidus de triage d'un trait de dragage d'huîtres plates (*Ostrea edulis* Linnaeus, 1758) dans le port ostréicole / mytilicole du Vivier-sur-Mer, en mars 2007. Le banc d'huîtres échantillonné se situe par 10 mètres de profondeur en pleine eau dans la zone sublittorale de la baie du Mont-Saint-Michel.

Taille de l'animal : 85,4 x 75,5 mm (Fig. 1). Le spécimen est de taille largement supérieure à ceux déjà en notre possession et achetés en poissonnerie de Perros-Guirec (mars 2003) provenant d'un lot étiqueté (Ria d'Etel - Morbihan) - 71,8 x 58,1 mm (Fig. 2).

Des populations éparses, autres que celles citées dans la littérature, existent le long des côtes atlantiques de France. La récolte de *Mercenaria mercenaria* sur les fonds sablo-vaseux de la baie du Mont-Saint-Michel révèle l'existence d'une population de ce bivalve dans la Manche au nord de la Bretagne.

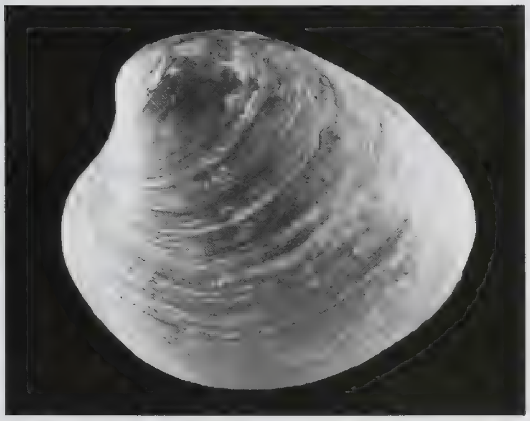

Figure 1. *Mercenaria mercenaria* Linnaeus, 1758
Baie du Mont-Saint-Michel: 85,4 x 75,5 mm.

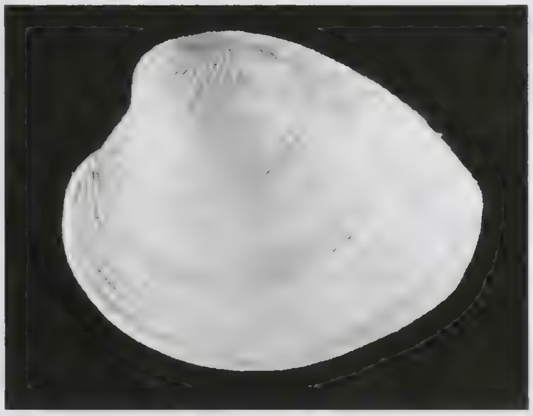

Figure 2. *Mercenaria mercenaria* Linnaeus, 1758
Ria d'Etel (Morbihan): 71,8 x 58,1 mm.

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Ocinebrellus inornatus (Ocenebra inornata) (Récluz, 1851) en baie du Mont-Saint-Michel (France)

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MOTS CLEFS. Mollusques, espèce invasive, *Ocinebrellus inornatus*, France.

KEY WORDS. Molluscs, invasive species, *Ocinebrellus inornatus*, France.

RESUME. Diverses publications signalent la présence de *Ocinebrellus inornatus* (Récluz, 1851) le long des côtes atlantiques françaises. La récolte d'un spécimen vivant en Baie du Mont-Saint-Michel confirme la présence de l'espèce en Manche.

ABSTRACT. Some publications mention the presence of *Ocinebrellus inornatus* (Récluz, 1851) along the Atlantic coasts of France. The gathering of a living specimen in the Mont-Saint-Michel Bay confirms the presence of the species into the Channel.

INTRODUCTION

Ocinebrellus inornatus (Récluz, 1851) est un Muricidae repris sous ce genre dans la plupart des articles publiés à ce jour. Houart et Sirenko (2003) considèrent cependant qu'il faut le placer dans le genre *Ocenebra*. Le but ici n'est pas de discuter du classement générique de l'espèce, de ce fait, comme pour tous nos articles, nous suivrons la classification de CLEMAM en utilisant le genre *Ocinebrellus*.

O. inornatus est originaire du nord-ouest du Pacifique [Russie (Iles Sakhaline et Kouriles), Chine, Corée et Japon]. Il accompagne bien malgré lui des transferts de populations de *Crassostrea gigas* (Thunberg, 1793) d'une région du monde à l'autre. On signale son apparition sur la côte nord-ouest des Etats-Unis et du Canada, en bordure de l'océan Pacifique: Etat de Washington (1924), Colombie-Britannique (1931), Oregon (1934) et Californie (1941) (Bouget et al. 2001). *O. inornatus* apparaît pour la première fois en France dans le bassin ostréicole de Marennes-Oléron en 1995 (Pigeot et al. 2000). Par la suite, sa progression vers le Nord se confirme par des récoltes dans le nord de la Vendée - port ostréicole des Brochets - (Delemarre 2004) et en Bretagne-Sud - zone ostréicole de la baie de Quiberon - (Bouget et al. 2001). Un exemplaire vivant a aussi été collecté dans une laisse de mer à Pirou-Plage - zone ostréicole du Cotentin - (Wimart-Rousseau 2004).

O. inornatus partage la niche écologique et le mode de prédation de son cousin autochtone *Ocenebra erinaceus* (Linnaeus, 1758). On le trouve dans la zone de balancement des marées et également en eaux plus profondes (Bouget et al. 2001). C'est un redoutable prédateur de bivalves. Les concentrations de *Crassostrea gigas* dans les zones ostréicoles en font une de ses proies privilégiées. *O. inornatus* perce la coquille des huîtres (Fig. 5) par l'action combinée de la radula et d'une glande de forage, il aspire ensuite les parties molles du mollusque à l'aide de sa trompe. Sa prédation sur *C. gigas* peut être économiquement importante. Les pontes, composées de sacs ovigères contenant plusieurs œufs sont déposées au printemps sur des substrats durs (Fig. 6). Il n'y a pas de stade larvaire pélagique. En conséquence, leur dispersion dans le milieu environnant reste limitée.

Des études génétiques basées entres autres sur l'analyse de l'ADN mitochondrial ont montré que les populations françaises et américaines d'*O. inornatus* étaient fort similaires, bien que non identiques, et substantiellement différentes des populations natives asiatiques. Si la population source à l'origine de celle qui s'est développée en France provient bien des Etats-Unis, il n'est pas exclu que des introductions non contrôlées ni répertoriées en provenance d'Asie aient également eu lieu (Martel et al. 2004a). L'expansion de l'espèce vers le nord ne semble pas être le résultat d'éléments fondateurs nouveaux mais réside bien plus dans le fait de mouvements de populations de *C. gigas* entre les différentes fermes ostréicoles des côtes atlantiques de France (Martel et al. 2004b). Les transferts de naissain ou d'adultes étant pratiques courantes entre la côte atlantique de Vendée - Charente et l'ouest de la Manche, il n'est pas étonnant de voir apparaître l'espèce dans le Cotentin (Wimart-Rousseau 2004).

Les différences morphologiques de la coquille existant entre les deux espèces - *O. inornatus* et *O. erinaceus* (Fig. 3) - sont largement décrites et illustrées par Delemarre (2004).

RECOLTES PERSONNELLES

Dans la baie du Mont-Saint-Michel (Carte 1), sur près de 1.000 ha de concessions en pleine mer, les ostréiculteurs sèment le naissain d'huîtres plates - *Ostrea edulis* Linnaeus, 1758 - par une dizaine de mètres de fond. Au terme de deux à trois ans de grossissement les huîtres sont récupérées pour être commercialisées. Cette opération se fait à la drague, à bord de chalands amphibies qui font l'originalité de la baie (Fig. 7). Le 18 mars 2007, dans le port ostréicole / mytilicole du Vivier-sur-Mer, un container en attente d'être vidangé contenait les résidus de triage d'un récent trait de drague effectué dans la baie.

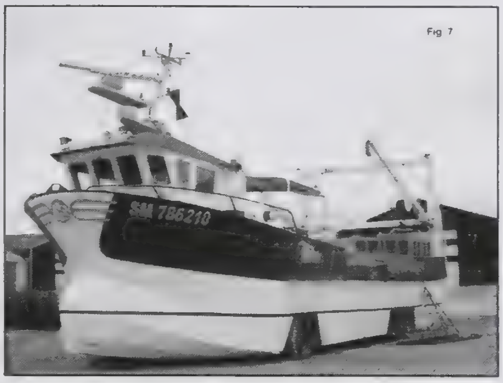

Fig 7

Parmi de nombreuses coquilles vides de *C. gigas* on pouvait identifier la présence de spécimens vivants *d'Ostrea edulis* (échappés au tri), *Pecten maximus* (Linnaeus, 1758), *Mytilus edulis* Linnaeus, 1758, *Glycymeris glycymeris* (Linnaeus, 1758), *Venus verrucosa* Linnaeus, 1758, *Ruditapes philippinarum* (Adams & Reeve, 1850) ainsi qu'un spécimen vivant de *Mercenaria mercenaria* Linnaeus, 1758 (Delongueville & Scaillet 2007). Parmi tous ces bivalves se trouvait un seul exemplaire de gastéropode: un spécimen operculé d'*Ocinebrellus inornatus* (Récluz, 1851) (Fig. 1 - 2). Taille de l'animal: 45,8 x 27,6 mm. Quoique moins colorée, la coquille est en tout point semblable à celle d'individus collectés par nos soins en mai 2001 dans un parc à huîtres creuses (*C. gigas*) de Saint-Trojan à Oléron (Fig. 4).

Le spécimen récolté au Vivier-sur-Mer provient d'un banc d'*O. edulis* situé en pleine eau, dans la zone sub-littorale. Quelle peut bien en être son origine ? Le naissain utilisé pour l'ensemencement de l'huître plate en Baie du Mont-Saint-Michel est capté naturellement en Baie de Quiberon sur des boudins garnis de coquilles de moule vides. Une population d'*O. inornatus* a été localisée dans ce territoire (Bouget et al. 2001). Aurait-elle eu accès au naissain d'*O.edulis* ? Le naissain de l'huître creuse (*C. gigas*) est quant à lui récolté sur des tuiles chaulées et les jeunes coquilles sont placées rapidement en poches à mailles fines dans lesquelles elles entament leur grossissement. On peut imaginer qu'à ce stade, ou peut-être plus tardivement, lorsque les poches sont placées sur tables (donc non loin du sol), des spécimens d'*O. inornatus* parviennent à peupler la culture. Tout au long de leur croissance les huîtres sont plusieurs fois manipulées, triées et nettoyées. Malgré toutes ces manipulations qui garantissent la propreté de la production, force est de constater que des spécimens d'*O. inornatus*, probablement des juvéniles, parviennent néanmoins à passer inaperçus et à donner souche à des populations indésirables. Enfin, restent à identifier les éventuels flux d'échanges existant entre les parcs à huîtres de Charente dans lesquels *O. inornatus* est déjà bien implanté et ceux de la Baie du Mont-Saint-Michel. Il serait aussi intéressant d'objectiver la présence d'*O. inornatus* en Baie du Mont-Saint-Michel dans la zone d'élevage de l'huître creuse située sur l'estran, avant la zone des bouchots et donc bien plus haut que la ligne de marée basse de vives eaux.

CONCLUSION

Ocinebrellus inornatus déjà établi en Atlantique (Charente-Maritime) semble bien s'adapter aux conditions écologiques de la Manche comme en témoignait déjà sa présence dans le bassin ostréicole du Cotentin. La récolte d'un individu vivant, au Vivier-sur-Mer, atteste de l'existence d'une population en baie du Mont-Saint-Michel. Les importations de naissain ou les échanges d'adultes entre les différentes zones ostréicoles de l'Atlantique et de la Manche sont à l'origine de l'établissement de ces nouvelles populations.

NOTE

La nomenclature des mollusques est reprise de CLEMAM, « Check List of European Marine Mollusca » www.somali.asso.fr/clemam/index.clemam.html (consultation: 27 juillet 2007).

REMERCIEMENTS

Nous remercions Frédérique Viard de la Station Biologique de Roscoff pour l'aide apportée à la consultation de la bibliographie et Roland Houart pour la relecture du manuscrit.

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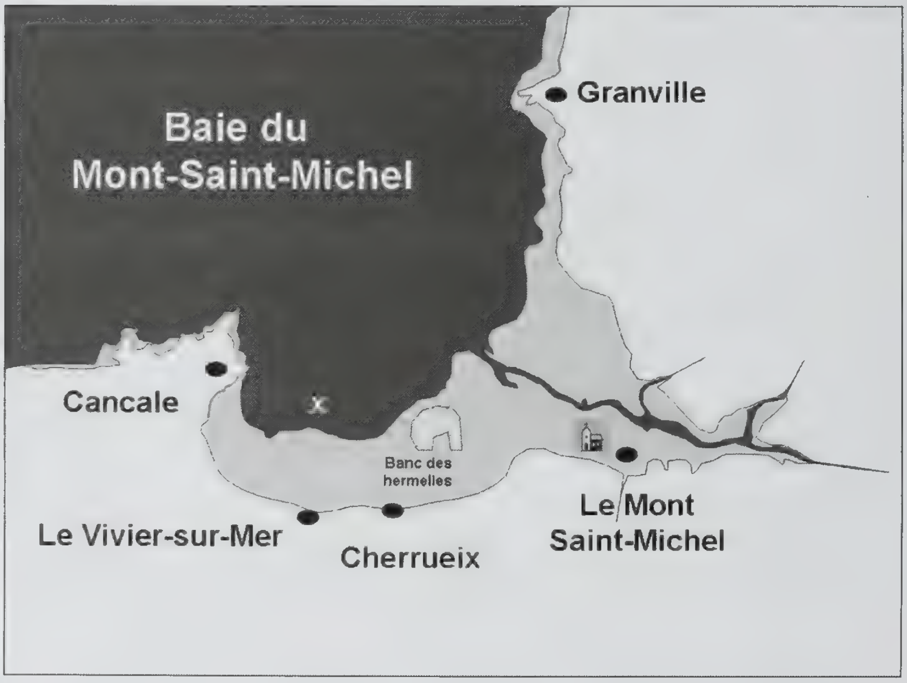
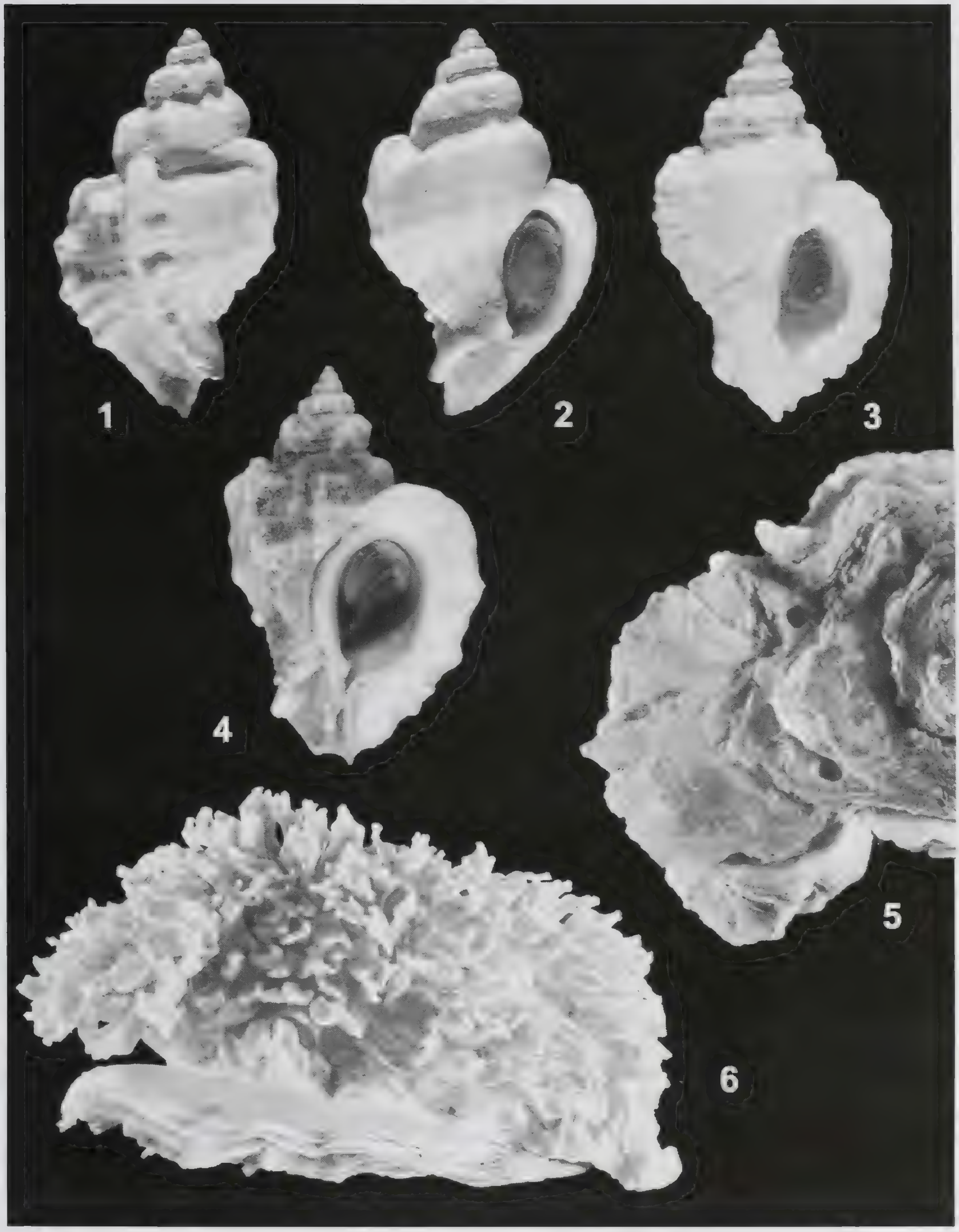
LEGENDES

Figure 1: *Ocinebrellus inornatus* - Baie du Mont-Saint-Michel - 45,8 x 27,6 mm
Figure 2: *Ocinebrellus inornatus* - Baie du Mont-Saint-Michel - 45,8 x 27,6 mm
Figure 3: *Ocenebra erinaceus* - Locmariaquer - Morbihan - 35,7 x 20,4 mm
Figure 4: *Ocinebrellus inornatus* - Saint-Trojan (Oléron) - Charente-Maritime - 51,3 x 32,7mm
Figure 5: *Crassostrea gigas* percée par *Ocinebrellus inornatus* - Saint-Trojan (Oléron) - Charente-Maritime
Figure 6: Ponte d'*Ocinebrellus inornatus* sur *Crassostrea gigas* - Saint-Trojan - Oléron- Charente-Maritime
Figure 7: Chaland amphibie - Le Vivier-sur-Mer - Ille et Vilaine

Carte 1



X : Lieu de prélèvement de *O. inornatus*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Visite chez notre ami Pierre Adrians, héliciculteur à Louvain-La-Neuve

Roland HOUART

En ce jour ensoleillé du 9 février 2007 je me suis rendu chez Pierre afin d'en ramener les préparations que bon nombre d'entre-nous auront dégusté lors de notre Assemblée Générale, car c'est aussi Pierre qui nous fourni souvent les délicieux amuse-bouches pour nos drinks. Ce jour-là, Pierre m'a emmené dans ses caves où ce petit monde se nourrit, se cajole, se trémousse et se reproduit pour le plus grand bonheur de nos papilles gustatives. J'en ai ramené un petit reportage photos que je vous livre ci-après.

Pierre nous montre ici une languette destinée aux enfants qui viennent fréquemment visiter son héliciculture

Tout se qui se mange… petite présentation pour les écoles

Un panneau fabriqué par des amis et "obligeamment" planté un soir sur l'avenue de Lauzelle…

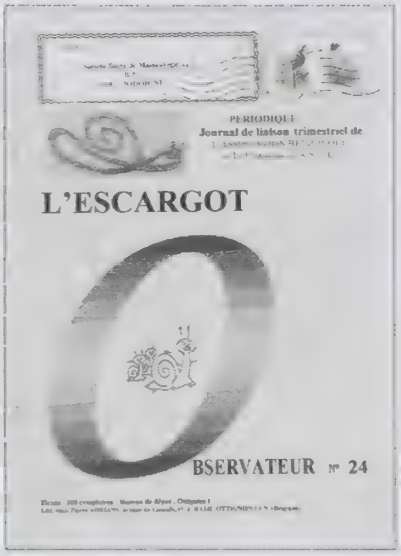
Au 41 Av. de Lauzelle à Ottignies Louvain-La-Neuve se situe un bien curieux élevage, celui de *Helix aspersa maxima* (ou Gros Gris) et de quelques-uns de ses congénères comme *Helix aspersa* (ou Petit Gris), *Zonites algirus* (escargot peson) *Eobania vermiculata* (mourguette) et *Helix melanostoma* (escargot terrassier) en provenance du Var, en France.

Il y a deux ans on aurait pu voir dans l'élevage 30*Helix aperta* venant de Sicile, 25 *Helix lucorum* et 20 *Helix pomatia* venant des pays de l'Est ou encore 29 *Achatina achatina* qui ont pondu 6000 œufs et donné 3200 juvéniles, et 15 *Achatina monochromatica*

Mais quels trésors recèlent donc ces cages ???

Oups, pardon de vous avoir dérangé ! Bonjour tout le monde !

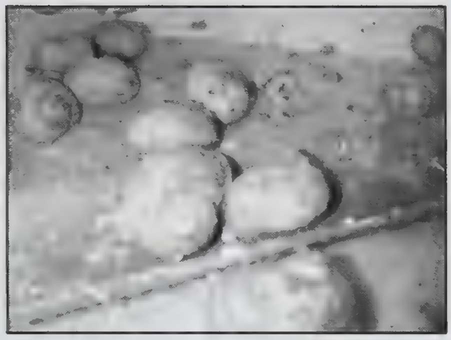
Pierre Adrians, héliciculteur passionné depuis 1980 (ancien président de A.H.B.) est également le fondateur et auteur "Du fascicule de l'escargot de A à Z", du "Manuel d'initiation à l'élevage des escargots", du livre de recettes "Les conseils du Chef", du DVD "le gros-gris" et de "L'Escargot Observateur", le journal de liaison trimestriel de l'Association Hélicicole "Li Caracole" situé à Ottignies Louvain-La-Neuve, un périodique que nos membres peuvent se procurer via notre bibliothèque ou en se faisant membre de cette association. "Li Caracole" contient des informations générales sur l'héliciculture mais également de délicieuses recettes ! Pour tout renseignement: licaracol1@scarlet.be.
Pierre n'est pas seulement passionné d'héliciculture, il est aussi bricoleur dans l'âme, ce qui peut s'avérer extrêmement utile pour le bon fonctionnement des appareillages nécessaires à ce genre de "hobby". Il "cultive" (hé, hé) d'autres passions, notamment un énorme Actinidia, dont le fruit, le kiwi, lui fournit de l'énergie pour tout l'hiver et un apéritif dont lui seul a le secret de fabrication (le WIKI).



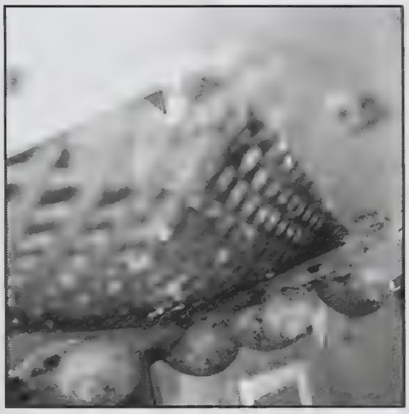
PERIODIQUE
Journal de liaison trimestriel de

L'ESCARGOT
OBSERVATEUR N° 24

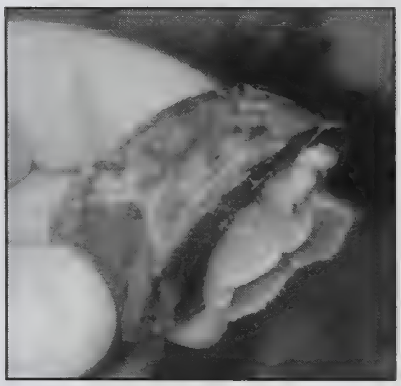
Mais... Voulez-vous bien sortir de cette mangeoire !



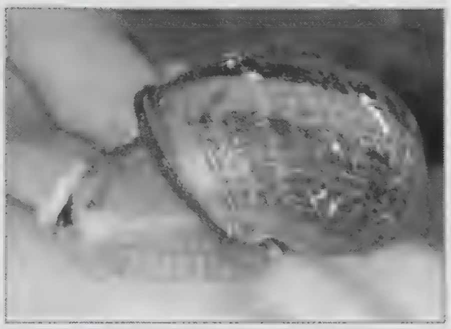
Il y en a vraiment partout...



Même sur la porte !



Voici l'artiste !



Finalement, c'est assez inoffensif ces bêtes là !

Gros Gris chagriné et Doré de Lauzelle

Une heure après le réveil, suivant le long engourdissement de l'hiver

4 heures après le réveil ... à la bouffe !

Quelques questions.

RH: Pierre, quand as-tu commencé l'élevage d'escargots et qu'est-ce qui t'a amené à cette passion ?

PA: En juin1979, j'étais en vacances en Bretagne (Moëllan sur Mer). Après quelques jours de très beau soleil j'ai dû décamper à cause de la pluie, direction le Tarn, arrêt en dessous de Limoges pour pique-niquer. Pendant l'arrêt j'ai remarqué dans un talus un énorme escargot noir d'une grosseur d'un Bourgogne. Après avoir bien examiné cet animal, nous l'avons emmené en vacances avec nous et enfin jusqu'à la maison, à Louvain-La-Neuve. Nous l'avons baptisé Nestor. Après avoir examiné cet animal sous toutes les coutures, je l'ai déposé dans les rocailles du jardin et après 3 jours… plus de Nestor il avait disparu. Au printemps de 1980, mon épouse l'aperçu dans le persil et 15 jours après il grimpait les marches de la véranda. Par la suite notre Nestor fut malheureusement piqué par un merle. Etant fasciné par cet animal, c'est depuis 1980 que mes études sur le comportement et sur l'élevage d'escargots ont démarré.

Autre espèce ramenée du Var en France *Zonites algirus* (escargot peson)

Elles aussi se sentent bien chez Pierre…

RH: Quels sont tes contacts avec l'étranger et avec d'autres hélicicultures?

PA: Mes contacts réels avec l'élevage ont débuté avec les premiers congrès annuels de l'INRA et de GNPE (à partir de 1981).

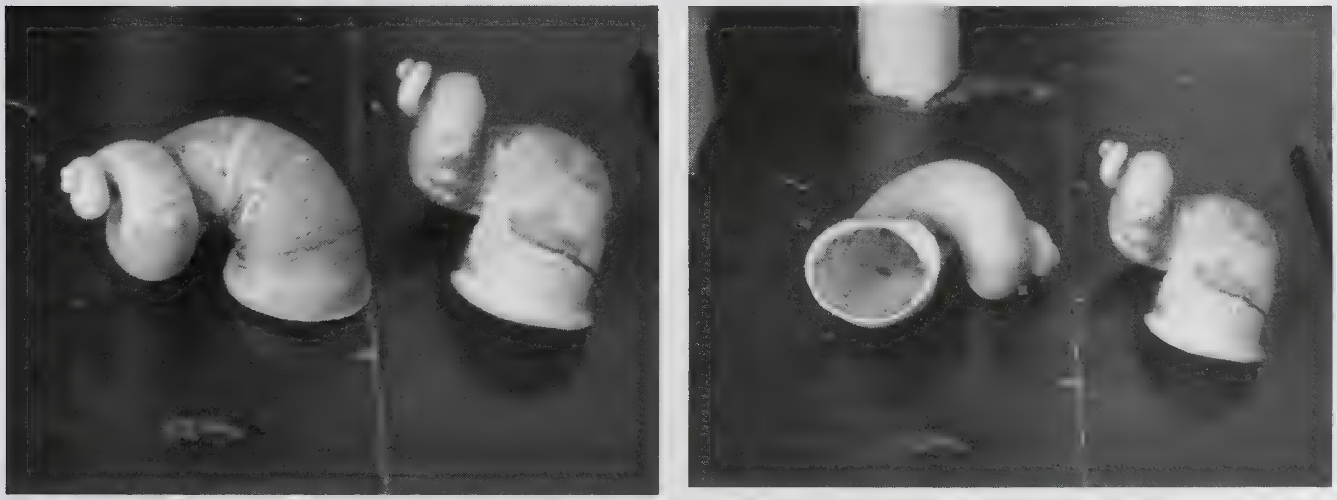
En 1989, suite à ma demande au Ministère de l'Agriculture Fédérale (à l'époque), démarrage d'une étude relative aux produits hélicicoles, subventionnée par la CEE et exécutée avec ma collaboration par la FUSAG (terminée en 1992).
En septembre 1995, et sur invitation de l'ANE (Association italienne de l'héliciculture) à Cherasco, présentation des élevages belges de petits-gris et de gros-gris
L'association italienne fêtait ses 25 ans d'existence et regroupait 5 associations internationales
En septembre 1999, et sur invitation de l'ANE présentation de l'élevage belge de gros-gris.
Suite aux différentes manifestations hélicicoles en France et en Italie des échanges entre héliciculteurs étrangers ont été profitables réciproquement.

Un ancien locataire...*Achatina achatina* (le géant des géants), a vécu 13 ans et à l'âge de 8 ans a pondu 900 œufs en quinze jours et a perdu 60 gr après la ponte !

RH: Aurais-tu une anecdotes à nous raconter?

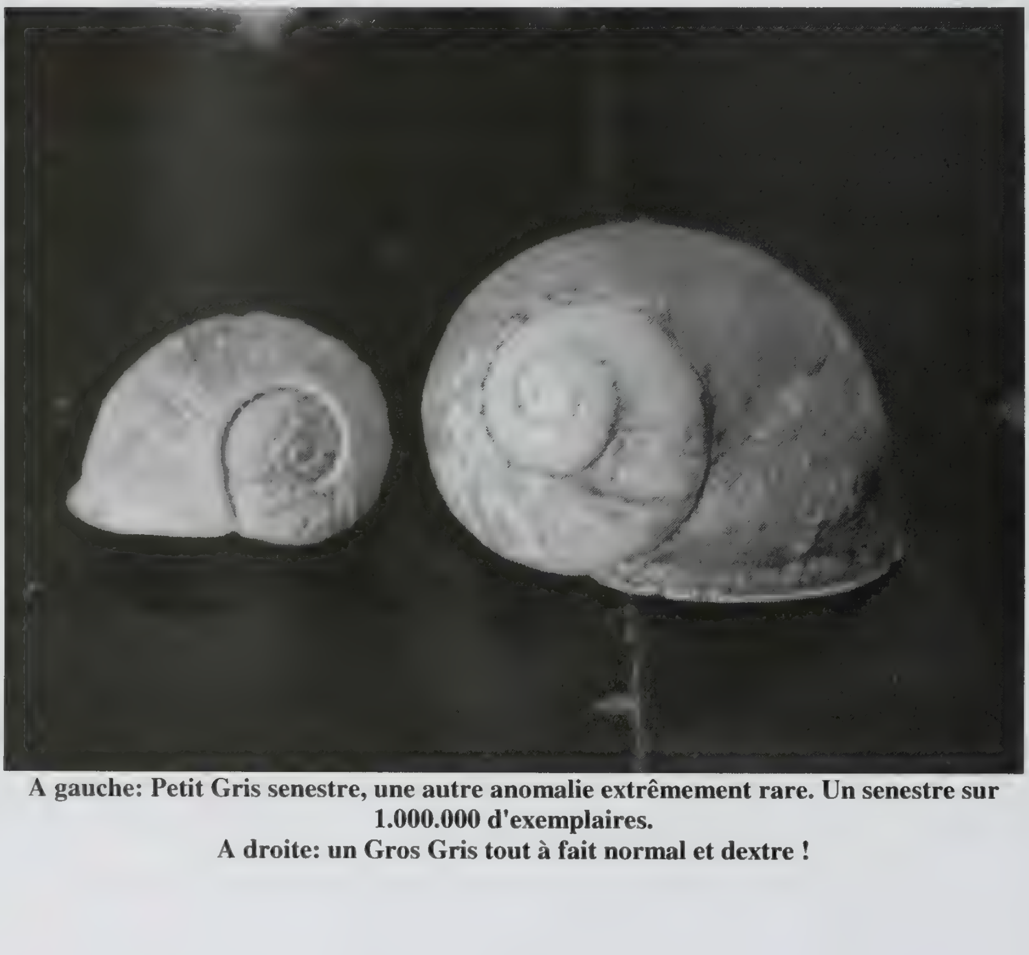
PA: Suite à mes recherches sur les individus gros-gris, une sélection s'est imposée et j'ai créé une variété unicolore "blonde dorée". Cette variété est stabilisée depuis 8 ans. Et les "dorés de Lauzelle" donne 100% de dorés. Les dorés sont déjà en Cote d'Ivoire, en Italie et à en Asie.

Merci Pierre et à très bientôt !



Doré de Lauzelle. Anomalie extrêmement rare, les spécimens scalariformes se trouvent à raison de 1 exemplaire sur 100.000. Même dans une héliciculture brassant des milliers d'exemplaires il faut avoir l'œil averti pour dénicher le juvénile avec le premier ou deuxième tour décollé...

Une petite vitrine chez Pierre, que la beauté des coquillages de laisse pas indifférent. Quelques artéfacts en verre, en porcelaine et autres matières, quelques coquilles rapportées par des amis et collées sur la face arrière et en bas d'anciens pensionnaires dont quelques anomalies

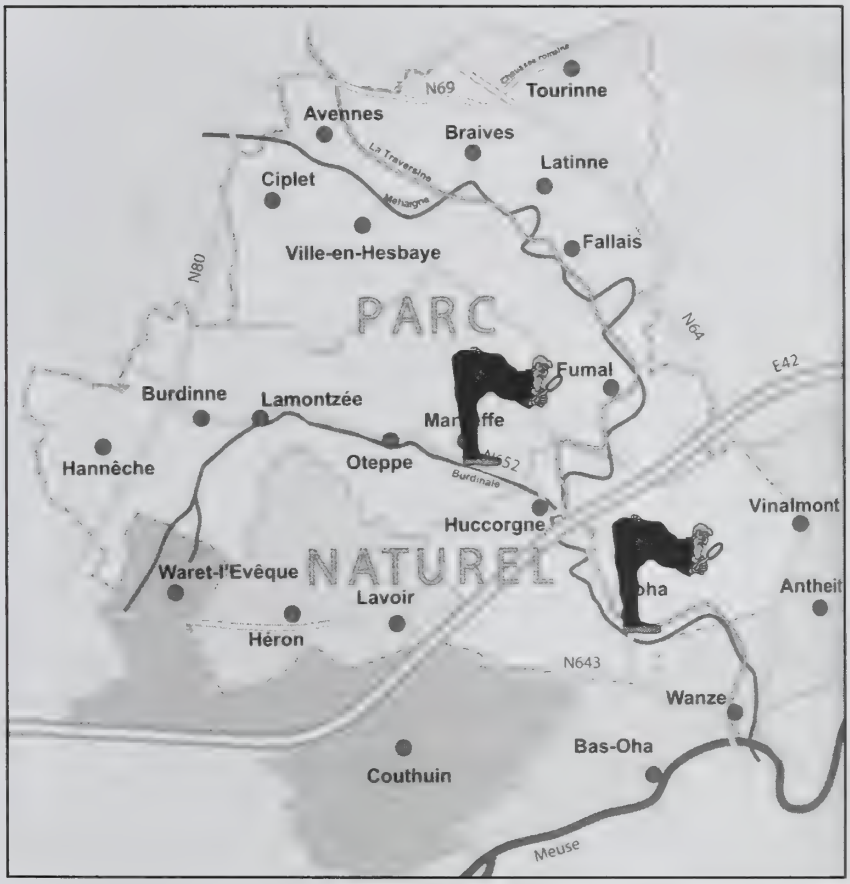


A gauche: Petit Gris senestre, une autre anomalie extrêmement rare. Un senestre sur 1.000.000 d'exemplaires.
A droite: un Gros Gris tout à fait normal et dextre !

L'excursion de printemps de la S.B.M. Parc Naturel de la Burdinale et de la Mehaigne (12 mai 2007)

Claude VILVENS

Le Parc Naturel de la Burdinale et de la Méhaigne (du nom des deux rivières qui le traversent) se trouve en province de Liège : il regroupe les 4 communes de Braives, Burdinne, Héron et Wanze (ce qui fait 23 villages) et correspond à une surface de 11 000 ha. Considérant qu'il se trouve enchâssé entre la Meuse et surtout le plateau de la Hesbaye, zone agricole s'il en est, on ne peut qu'être un peu surpris d'apprendre que ces vallées de la Burdinale et de la Méhaigne abritent en fait une grande diversité de flore et de faune. Il faut dire aussi que les paysages sont très variés : des versants boisés voisent des étendues agricoles, de beaux affleurements rocheux voisinent des prairies sèches, on peut même trouver des zones humide voire marécageuses.


Chaussée romaine
N69
Tourinne
Avennes
Braives
La Traversine
Latinne
Ciplet
Méhaigne
Ville-en-Hesbaye
Fallais
N80
PARC
N64
E42
Fumal
Burdinne
Lamontzée
Mar
ffe
Hannêche
Oteppe
N652
Burdinale
Vinalmont
Huccorgne
Waret-l'Evêque
NATUREL
ha
Antheit
Lavoir
Héron
N643
Wanze
Bas-Oha
Couthuin
Meuse

Helix pomatia Linné, 1758
omniprésent dans la Parc Natural

Une telle zone mérite donc tant un souci touristique (une vingtaine de promenades balisées la sillonne) que naturaliste : une Maison du Parc Naturel voisine la Maison du Tourisme dans la cadre magnifique de la Ferme de la Tour (une ferme-château datant du 16 au 18ème siècle).

De façon surprenante, il est vite apparu qu'il n'existait aucun relevé malacologique précis de cette région, même après avoir contacté les responsables de la Maison du Parc. La tentation était évidemment trop forte de prospecter dans une telle zone "vierge" de toute étude. Mais il faut bien dire que les premières reconnaissances nous ont un peu déçus : non pas pour les milieux en eux-mêmes, mais parce que le nombre de terrains clôturés est très important. Clairement, on ne va pas où l'on veut, notamment pas sur les beaux rochers (comme ceux de la Marquise ☹) pourtant si alléchants pour un malacologue de terrain. De plus, le mois d'avril exceptionnellement chaud ne nous aidait guère …

C'est donc un petit miracle que de constater qu'il avait plu la semaine précédant l'excursion ☺. Et tous les espoirs étaient donc permis pour les deux sites que nous avions l'intention de prospecter.

Le Bois Taille-Gueule

Situé près du centre pénitentiaire de Marneffe (quand on vous parlait de grilles ;-) !), ce bois magnifique s'est révélé très intéressant. Au milieu de fleurs sauvages variées, nous avons trouvé un certain nombre d'espèces de Terrestres, tant à coquilles que limaces – jamais cependant en très grand nombre :

Clausiliidae
Clausilia bidentata (Ström, 1765)
Macrogastra rolphii (Turton, 1831)

Succineidae
Succinea putris (Linné, 1758)

Discidae
Discus rotundatus (Müller, 1774)

Limacidae
Limax maximus Wolf, 1803

Arionidae
Arion rufus (Linné, 1758)

Zonitidae
Aegopinella nitidula (Draparnaud, 1805)
Oxychilus draparnaudi (Beck, 1837)
Oxychilus cellarius (Müller, 1774)

Bradybaenidae
Bradybaena fruticum (Müller, 1774)

Hygromiidae
Hygromiinae
Monachoides incarnatus (Müller, 1774)
Trichia hispida (Linné, 1758)

Helicidae
Helicinae
Cepaea hortensis (Müller, 1774)
Helix pomatia Linné, 1758

La Traversine à Moha

Après une zone couverte, relativement humide, nous nous sommes orientés vers Moha et la voie de chemin de fer qui longe puis recoupe la Méhaigne La configuration des lieux pouvait nous faire espérer la détection d'espèces appréciant la chaleur, comme des *Helicella* ou *Cernuella*. En fait, nous avons été accueillis par des *Bradybaena fruticum* ! Par la suite, nous avons trouvé beaucoup de coquilles mortes (et souvent blanchies) mais fort peu de spécimens vivants – un peu décevant donc :

Clausiliidae
Clausilia bidentata* (Ström, 1765)

Endodontidae
Discus rotundatus* (Müller, 1774)

Orculidae
Sphyradium doliolum* (Bruguiere, 1792)

Discidae
Discus rotundatus (Müller, 1774)

Bradybaenidae
Bradybaena fruticum (Müller, 1774)

Hygromiidae
Monachinae
Monacha cartusiana* (O.F.Müller, 1774)

Helicidae
Helicellinae
Helicella itala* (Linné, 1758)
Helicinae
Cepaea hortensis* (Müller, 1774)
Helix pomatia Linné, 1758

Le fait d'avoir trouvé des coquilles de ***Monacha cartusiana*** (O.F.Müller, 1774), même à l'état mort, mérite d'être signalé : les références comme Adam donne l'espèce comme rare à l'intérieur de la Belgique tandis que l'atlas de DeWilde et al. ne la signale pas en Meuse Moyenne (seulement en Haute Meuse). L'espèce est par contre répandue en France. Cependant, des éléments caractéristiques comme l'ombilic minuscule, partiellement obturé par le bord du péristome, l'ouverture elliptique avec un épaississement interne la bande jaune suivie d'une bande rouge tout le long de l'ouverture sont suffisamment discriminants pour que tout risque d'erreur de détermination soit écarté. De nouvelles recherches devraient tenter de savoir si l'espèce est toujours vivante dans la zone fouillée.

Cette dernière remarque vaut d'ailleurs pour d'autres et il serait sans doute fort intéressant de reprospecter les deux aires parcourues (Marneffe et Moha), spécialement après une période moins chaude et plus humide que celle qui fut la nôtre, afin d'affiner notre connaissance malacologique de ces lieux.

Pour en savoir plus sur le Parc Naturel de la Burdinale :
http://www.tourismebm.be/
http://www.burdinale-mehaigne.be/
http://www.mmer.be/

Oxychilus cellarius (Müller, 1774) s'intéressant à un ***Trichia hispida*** (Linné, 1758) parfaitement indifférent …

Deux ***Helix pomatia*** Linné, 1758 veillant à la survie de l'espèce !

Ci-dessus : Deux spécimens de la Limace rouge ***Arion rufus*** (Linné, 1758), respectivement sur une feuille et sur un tronc d'arbre (remarquer le copinage avec une autre bestiole …)

A droite : Photo people : la Limace panthère ***Limax maximus*** Wolf, 1803 occupée à bronzer sur un tronc d'arbre.

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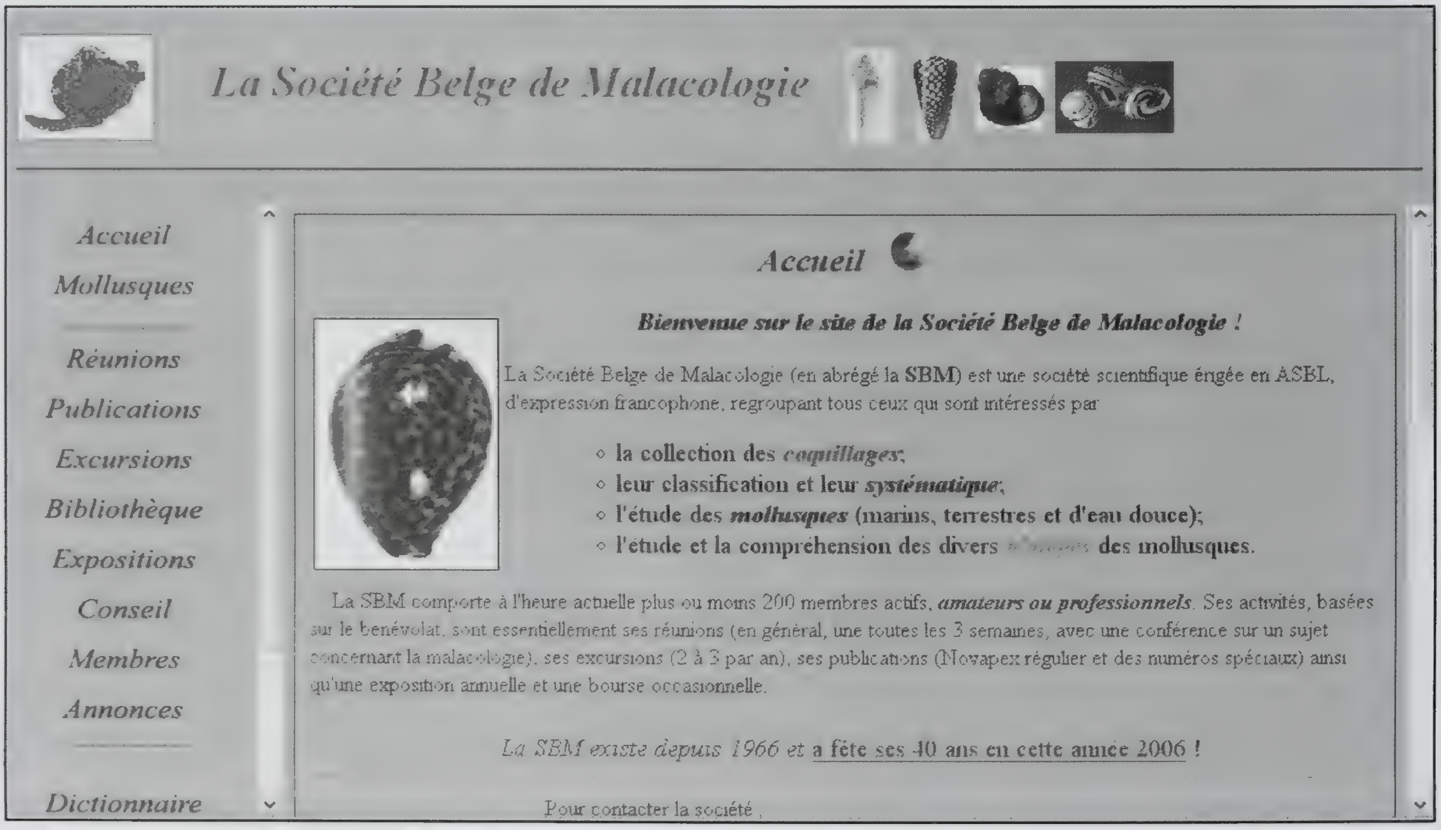
Rendez-vous à la prochaine excursion (mai 2007) !

Des nouvelles en direct de la SBM ? http://users.swing.be/sw216502 ou http://www.sbm.be.tf



La Société Belge de Malacologie

Accueil

Bienvenue sur le site de la Société Belge de Malacologie !

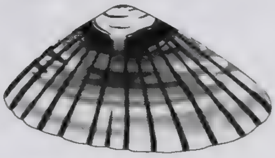
La Société Belge de Malacologie (en abrégé la **SBM**) est une société scientifique érigée en ASBL, d'expression francophone, regroupant tous ceux qui sont intéressés par

- **la collection des *coquillages*;**
- **leur classification et leur *systématique*;**
- **l'étude des *mollusques*** (marins, terrestres et d'eau douce);
- **l'étude et la compréhension des divers [illegible] des mollusques.**

La SBM comporte à l'heure actuelle plus ou moins 200 membres actifs, ***amateurs ou professionnels***. Ses activités, basées sur le bénévolat, sont essentiellement ses réunions (en général, une toutes les 3 semaines, avec une conférence sur un sujet concernant la malacologie), ses excursions (2 à 3 par an), ses publications (Novapex régulier et des numéros spéciaux) ainsi qu'une exposition annuelle et une bourse occasionnelle.

La SBM existe depuis 1966 et a fêté ses 40 ans en cette année 2006 !

Pour contacter la société ,



L'écho des réunions

Annie LANGLEIT & Etienne MEULEMAN

Réunion du 20 mai 2007 (AL) ➔ **Kevin Monsecour : la famille des Columbellidae, Swainson, 1840.**

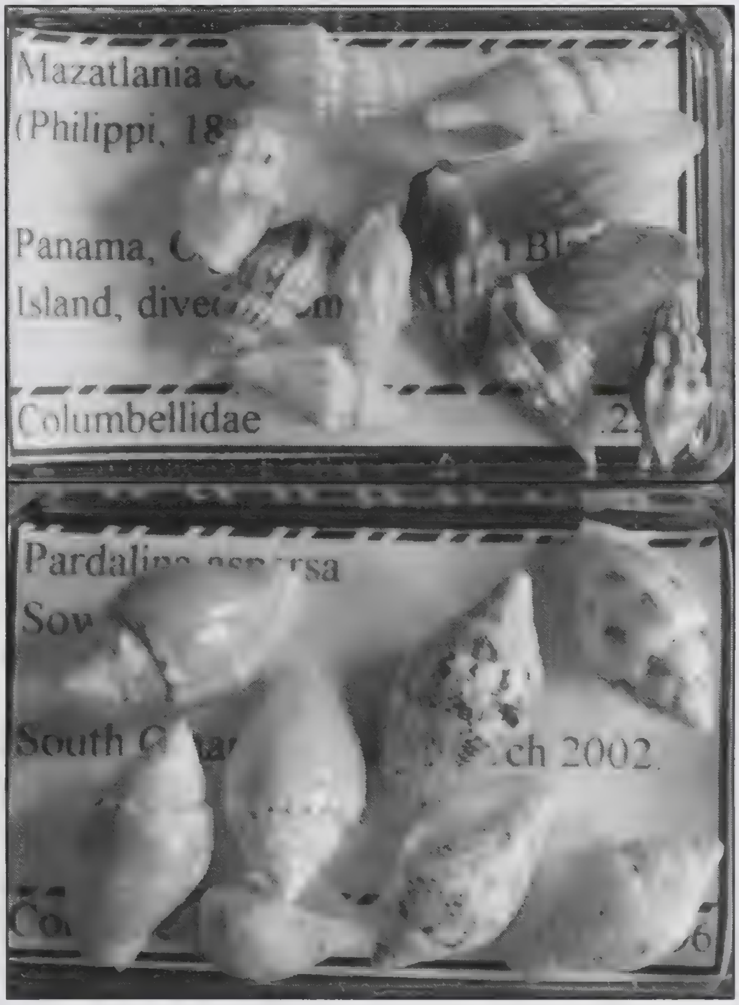
Kevin Monsecour, spécialiste en la matière, nous a détaillé la classification récente, très complexe, mais encore en évolution, des Columbellidae : grande famille, plus de 500 espèces, deux sous-familles, genres très nombreux.

De ravissantes petites coquilles très mal connues au point que certaines étaient classées un peu partout, dans d'autres familles, et qu'inversement, on avait inclus dans les Columbellidae des espèces non conformes. Leur taille va de 2 à 50 mm, mais se situe plus souvent aux alentours de 10 mm.

Il nous avait apporté toute une collection d'exemplaires et son exposé était illustré de photos de chaque genre, un travail considérable et très intéressant.

Il nous a également signalé les travaux de Madame Marta J. de Maintenon, une américaine spécialisée en zoologie marine des Invertébrés, dont les recherches d'ADN pour cette famille lui sont très précieuses.

L'assemblée était malheureusement assez clairsemée, sans doute à cause du beau temps ou des vacances pour certains, mais comme les absents ont toujours tort, c'est bien connu, ce jour-là ils ont raté un exposé vraiment passionnant et d'une grande qualité.



Columbellidae
Pana
122

Réunion du 23 juin 2007 (EM) → **Rolf Aubrichs : La Pourpre.**

Une vingtaine de malacologues sont venus écouter notre charmant orateur. Il s'agissait de Rolf Aubrichs qui avait fait le déplacement de Suisse pour nous parler de sa passion, la Pourpre. Depuis des années, notre orateur parcourt le monde pour retracer l'histoire de cette teinture qui influença de multiples peuples au cours de l'histoire.

Voilà en résumé ce que j'ai pu retenir de sa conférence :

Nous vivons dans le monde, un monde de couleurs. Nous pouvons distinguer différents types de couleurs : les couleurs naturelles non utilisables par l'homme comme celles de l'arc en ciel ou de la mer, que l'on ne peut « récolter ». Il y a aussi celles utilisables par l'homme mais qui changent avec le temps (un crabe bleu qui une fois cuit devient rouge).

Dans le monde végétal, nous trouvons de nombreuses matières végétales, mais beaucoup d'entre elles ne résistent pas (une tache de fruit sur un vêtement finit pas s'estomper). Il est bon de noter que c'est parfois dans les plantes les moins colorées que l'on trouve les colorants les plus forts.

Mais venons en à notre sujet : la pourpre.

D'où vient la pourpre ? La légende raconte qu'un chien a croqué dans un coquillage et que sa bouche a été teintée de rouge. Une princesse passait par là et a voulu un habit de cette couleur. Au Liban, cette légende est encore bien vivante.

Il faut 12.000 coquilles pour récolter 1,4 g de pourpre (couleurs dérivée de l'indigo). D'un point de vue chimique, le pourpre est une molécule d'indigo avec deux atomes de brome attachés. C'est une formule compliquée à reproduire en laboratoire, c'est pour cette raison que la pourpre n'a jamais été fabriquée en grande quantité.

La couleur pourpre était réservée aux personnages importants, seul l'empereur avait le droit de porter des vêtements entièrement en pourpre.

Mais comment extrait-on le pourpre ?

Il existe différents procédés pour obtenir la pourpre. La teinture directe, l'animal est frotté contre les fibres et émet un liquide incolore qui au contact de la lumière teinte le tissu de manière irréversible. Un autre procédé consiste à extraire la glande avec l'ongle ou avec un pince et de l'appliquer entière ou broyée sur le tissu à teinter…

Mais la pourpre n'a pas seulement été utilisée au Moyen-Orient. On a retrouvé des traces de son utilisation en Irlande où les marins utilisaient cette teinture pour marquer leurs initiales sur les vêtement. Au Chili et au Japon, des morceaux de tissus ont révélé l'usage de cette teinture. En Grèce, des fresques ont été retrouvées avec des fragments de couleur pourpre.

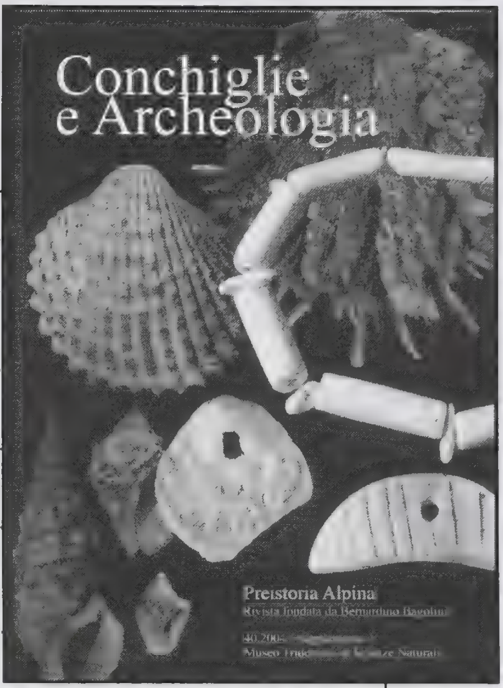
En résumé, aux quatre coins du monde, les hommes se sont servis de cette couleur naturelle pour teinter leurs vêtements ou leurs tissus. La pourpre a fasciné et fascine encore les hommes d'aujourd'hui. Il y a de grandes chances qu'elle ne nous a pas encore révélé tous ses secrets.

La conférence qui nous a été présentée est le résultat d'un travail de recherche personnelle issu d'une passion personnelle sur la couleur pourpre.

Merci à notre conférencier de nous avoir fait part de sa passion.

Les personnes sont intéressées par le sujet peuvent consulter le site de Rolf Haubrichs sur http://www.mtsn.tn.it/pubblicazioni/7/40-1/133-160_Haubrichs.pdf

(*N.D.L.R.*) De plus, Rolf nous a offert un exemplaire de "Conchiglie e Archeologia", numéro spécial de la revue "Preistoria Alpina" dans lequel, entre autres, figure l'un de ses articles sur la pourpre – merci à lui ☺ !


Conchiglie e Archeologia
Preistoria Alpina
Rivista fondata da Bernardino Bagolini
40 2005
Museo Tridentino di Scienze Naturali

Michele Lanzinger - Presentazione ....

Ringraziamenti ....

Osvaldo Negra & Giovanna Zobele Lipparini
Gasteropodi, Bivalvi, Scafopodi ....

Maria Angelica Borrello
Conchiglie e archeologia. Oltre 150 anni di ricerche ....

Maria Angelica Borrello
Le conchiglie nella preistoria e nella protostoria ....

Maria Angelica Borrello & Giampaolo Dalmeri
Gli ornamenti preistorici lavorati in conchiglie conservati presso il Museo Tridentino di Scienze Naturali (Trento) ....

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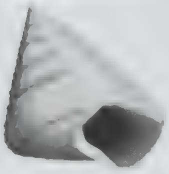

Quoi de neuf ?

Roland HOUART

Malheureusement une bien triste nouvelle ...

Jacques VIDAL
06.12.1926- 22.09.2006

C'est avec beaucoup de tristesse que fin 2006 nous apprenions le décès de M. Jacques Vidal.
Géologue de formation, sa profession devait l'amener dans diverses régions d'Europe et d'Afrique où il devint rapidement "accroc" aux coquillages grâce à ses recherches fréquentes le long des bords de mer.
Petit à petit il opéra une sélection qui l'intéressait particulièrement et se spécialisa dans les Cardiidae. Il s'est ainsi forgé une collection de référence qui devait l'amener à étudier cette belle famille de façon très approfondie.
Il devint attaché au Muséum national d'Histoire naturelle de Paris, établissement qu'il fréquentait assidûment depuis1984, année de sa retraite. Je l'y ai rencontré à deux reprises, toujours penché sur ses chers Cardiidae.
Il a publié de nombreux articles dans diverses publications, dont *Apex* et *Novapex*. Le dernier en date est malheureusement resté incomplet après son décès, mais Jan Johan ter Poorten, autre spécialiste de cette famille, a très gentiment accepté de reprendre le manuscrit. Il est publié dans le n° 3 du volume 8 de Novapex.
Une espèce fut également nommée en son honneur: *Vepricardium vidali* Ter Poorten & Dekker, 2002. Une marque de respect et un signe de remerciement bien mérité pour le travail de cet homme de valeur que le monde de la malacologie regrette amèrement.
Au nom du conseil d'administration de la Société Belge de Malacologie nous présentons nos plus sincères condoléances à son épouse et à sa famille.

Roland Houart

Remerciements.
Je remercie particulièrement Mme G. Vidal, son épouse, et Mme Virginie Héros du MNHN pour les renseignements qu'elles m'ont aimablement transmis. Merci également à M. Jan Johan ter Poorten pour sa relecture.

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Nouveau genre
Pseudofulvia Vidal & Kirkendale, 2007

Nouveau sous-genre
Laevifulvia Vidal, 1994

Nouvelles espèces
Acrosterigma fidele Vidal, 1992
Acrosterigma elongatum cipangense Vidal, 1993
Acrosterigma elongatum coralense Vidal, 1993
Acrosterigma elongatum indioceanum Vidal, 1993
Fulvia (Fulvia) boholensis Vidal, 1994
Fulvia (Fulvia) fragiformis Vidal, 1994
Fulvia (Fulvia) scalata Vidal, 1994
Fulvia (Laevifulvia) ballieni Vidal, 1994
Fulvia (Laevifulvia) lineonotata Vidal, 1994
Fulvia (Laevifulvia) prashadi Vidal, 1994
Vasticardium papuanum Vidal, 1996
Vasticardium luteomarginatum insulare Vidal, 1997
Vasticardium thomassini Vidal, 1998
Acrosterigma abrolhense Vidal, 1999
Acrosterigma amirante Vidal, 1999
Acrosterigma discus Vidal, 1999
Acrosterigma hobbsae Vidal, 1999
Acrosterigma maculosum howense Vidal, 1999
Acrosterigma paulayi Vidal, 1999
Acrosterigma profundum Vidal, 1999
Acrosterigma selene Vidal, 1999
Acrosterigma seurati Vidal, 1999
Acrosterigma suluanum Vidal, 1999
Acrosterigma uniornatum Vidal, 1999
Vepricardium albohamatum Hylleberg & Vidal *in* Vidal, 2000
Vasticardium subassimile Vidal, 2003
Vasticardium lomboke Vidal, 2003
Laevicardium oblongum castanea Vidal, 2005
Acrosterigma capricorne Vidal & Kirkendale 2007
Ctenocardia fijianum Vidal & Kirkendale 2007
Ctenocardia gustavi Vidal & Kirkendale 2007
Ctenocardia subfestivum Vidal & Kirkendale 2007
Fulvia colorata Vidal & Kirkendale 2007
Fulvia imperfecta Vidal & Kirkendale 2007
Fulvia subquadrata Vidal & Kirkendale 2007
Fulvia vepris Vidal & Kirkendale 2007
Pseudofulvia arago Vidal & Kirkendale 2007
Pseudofulvia caledonica Vidal & Kirkendale 2007
Acrosterigma suduirauti Vidal & ter Poorten, 2007

Quelques nouvelles publications

Roland SCAILLET, Roland HOUART & Claude VILVENS

1. Quelques livres

Fusinus del Mediterraneo
Mediterranean *Fusinus*

par **G. Buzzurro & P. Russo**

pp. 1-280
Prix: 68 EUR.

Adresses des auteurs:
Giovanni Buzzurro, Via Locatelli 44, 20046 Biassono (Milano) Italie giobuz@libero.it
Paolo Russo, Giudecca 459, 30133 Venezia Italie russorusso@virgilio.it

Fusinus del Mediterraneo
Mediterranean *Fusinus*
GIOVANNI BUZZURRO
&
PAOLO RUSSO

Les amateurs de mollusques marins de Méditerranée se réjouiront de la publication de ce très bel ouvrage consacré au genre *Fusinus* en Méditerranée. On le doit à la plume de Giovanni Buzzurro et de Paolo Russo. Ces auteurs ne sont plus à présenter dans le monde de la malacologie méditerranéenne. Ils nous offrent ici une monographie couvrant quatre nouvelles espèces et onze espèces connues. 16 autres taxas sont discutés dans le livre. Les auteurs abordent entre autres le large éventail du matériel examiné, les éléments d'étymologie, de chronostratigraphie, et de systématique; les informations relatives à la description des coquilles; l'anatomie, l'habitat et la distribution géographique de chacune des espèces; et enfin différents points de discussion apportant les éléments de comparaison appropriés entre espèces voisines. L'iconographie est abondante: 30 planches (dont vingt en couleur) et 10 tableaux. La protoconque et la radula de chaque espèce sont également illustrées par des photographies en microscopie électronique. Les auteurs ont consulté de nombreuses références et ont eu des contacts avec de nombreuses personnes afin d'être les plus complets possible. L'ouvrage écrit en italien et en anglais est préfacé par le Dr Emilio Rolán (Vigo - Espagne), il comporte 280 pages et est publié en tirage limité sur du papier mat (150 g), dos cousu et belle couverture cartonnée en quadrichromie. L'ouvrage s'achète à 68 € frais de transport non compris. Un ouvrage qui se doit de figurer en bonne place dans votre bibliothèque.

Roland Scaillet

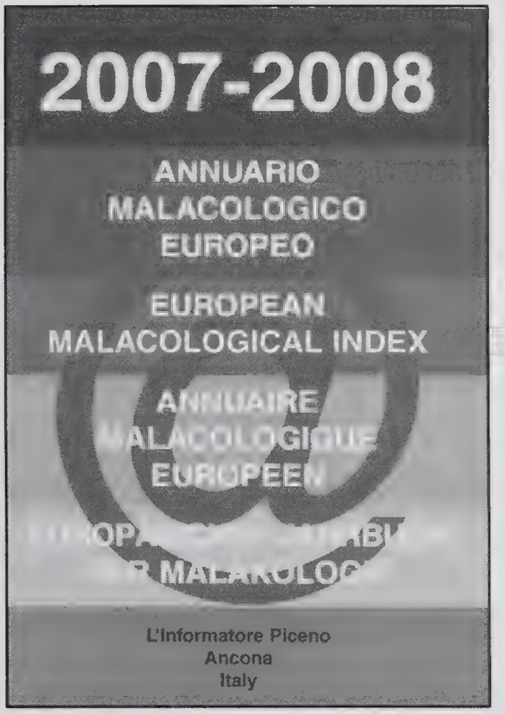
ANNUARIO MALACOLOGICO EUROPEO
-
ANNUAIRE MALACOLOGIQUE EUROPÉEN

pp. 1-224, illustrations couleurs
Format: 170 x 240 mm, couverture souple.
Prix: 25 € + frais d'envoi.

Editeur: L'Informatore Piceno, Ancona, Italie
malacologia@fastnet.it

Comme les éditions précédentes, ce volume se veut l'annuaire illustré de tous, ou du moins de la plupart des malacologues, conchyliologues et collectionneurs européens de coquillages.

La première partie est consacrée aux musées, classés par pays et alphabétiquement. On peut y trouver une foule de renseignements: adresse + adresse e-mail et autres données tel que téléphone, fax, horaire des visites, adresse du site, le nom du conservateur et de ses collaborateurs directs et de nombreuses autres choses bien utiles.


2007-2008
ANNUARIO MALACOLOGICO EUROPEO
EUROPEAN MALACOLOGICAL INDEX
ANNUAIRE MALACOLOGIQUE EUROPEEN
L'Informatore Piceno
Ancona
Italy

La deuxième partie est dédiée aux sociétés et à leurs publications. Cette partie est suivie d'adresses de sites malacologiques et de la liste des différentes bourses européennes (2007 et 2008).

La revue photographique des malacologues et collectionneurs, et l'annuaire malacologique occupent la majeure partie de cet ouvrage et clôture ce volume régulièrement mis à jour (la première édition date de 1994).

Il est d'ailleurs intéressant de noter les nettes améliorations des photos depuis 1994 (du noir et blanc vers la couleur) et le nombre d'informations en constante augmentation. De quelques 7 pages de photos de malacologues et collectionneurs en 1994, la version 2007 nous en offre à présent 50 pages tout en couleur avec 12 photos par page !

Quelques personnes illustres ont malheureusement disparus du dernier volume suite à leur décès pour la plupart. Il serait peut-être intéressant de leur rendre hommage dans un prochain volume en y incorporant leur photo, ce qui aurait aussi comme résultat de nous remémorer le visage de certaines personnes trop tôt disparues et quelques bons moments passés ensemble (ah… nostalgie quand tu nous tiens).

L'index malacologique qui termine ce livre sur 67 pages reprend le nom et l'adresse postale de la plupart des collectionneurs européens, classés par pays et par ordre alphabétique.

C'est sans hésitation que je conseille l'achat de ce volume qui nous permettra de mettre un visage sur le nom d'un personne souvent citée, qui nous restait malgré tout assez inconnue jusqu'à présent.

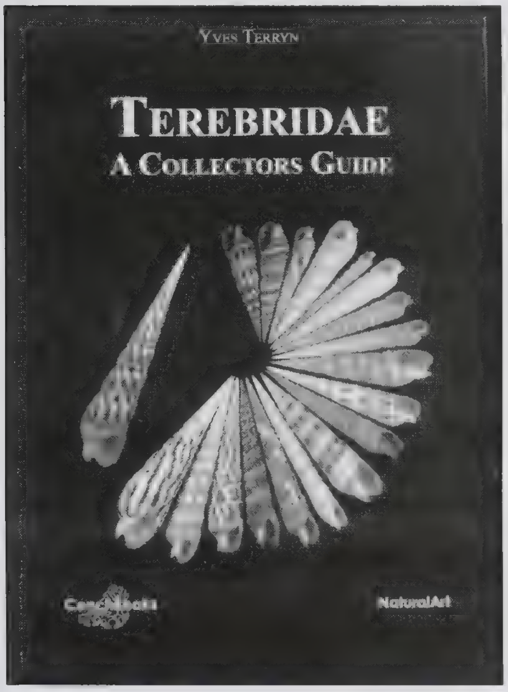
Roland Houart

Terebridae, A collector guide

par **Yves Terryn**

pp. 1-57, 65 planches couleurs.
Format 210 x 300 mm, couverture cartonnée.
Prix: 48 € + frais d'envoi.

Editeur: Conchbooks. Mainzer str. 25, D-555546 Hackenheim, Allemagne
conchbooks@conchbooks.de



Ce livre, comme le souligne le Prof. Philippe Bouchet dans sa préface, est le résultat d'une discussion qu'il avait eu avec l'auteur il y a quelques années. Si toutes les discussions pouvaient aboutir à un tel résultat, le monde de la malacologie s'en trouverait certainement enrichi.

L'auteur, comme il le précise dans l'introduction, a voulu nous présenter un catalogue illustré à l'usage des collectionneurs et des musées; mais il s'agit également d'une première tentative pour grouper les espèces de cette très belle famille. Essai réussi dirons-nous, grâce au listing bien ficelé, regroupé par genre et quelquefois par groupes d'espèces et aux illustrations. Chaque espèce est listée, sans mention des synonymes, mais reprenant la taille, la distribution géographique et quelques commentaires. La partie systématique se termine par quelques additions à la liste de Bratcher et Cernohorsky, qui en 1987 avaient publiés une très bonne révision de cette famille.

Les remerciements d'usage précèdent une bibliographie de quelques 11 pages, quelques reproduction de *Terebra* de Sowerby (1842-1887), l'index, la liste des abréviations et les 65 planches couleurs.

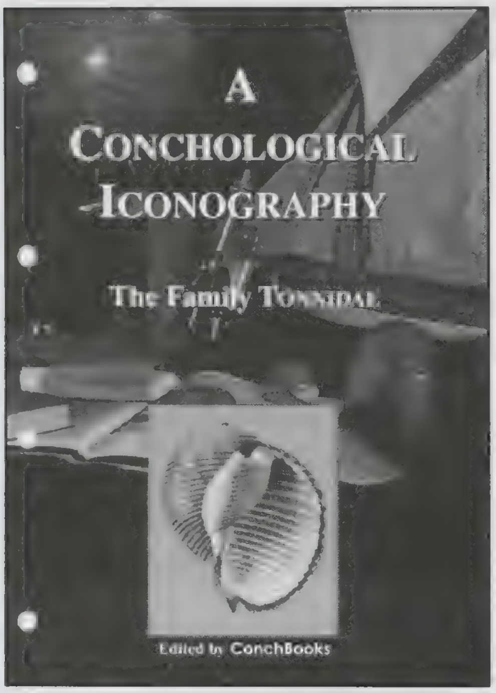
Les photographies sont d'une qualité irréprochable. Les coquilles sont représentées sur fond noir et sont accompagnées du nom, de la localité et de la taille. Plusieurs spécimens sont illustrés pour chaque espèce et quelques 17 planches sont consacrées à la comparaison de la sculpture et d'ouvertures. L'auteur illustre également quelques photographies d'animaux vivants.
Si vous possédez des Terebridae ou si vous êtes spécialisé dans cette famille, n'hésitez pas, offrez-vous ou faites vous offrir ce catalogue richement illustré.

Roland Houart

A Conchological Iconography
THE FAMILY TONNIDAE
par Chris Vos (texte) et Yves Terryn (photos)

pp. 1-117, 63 planches couleurs.
Prix: 60 € + frais d'envoi.

Editeur: Conchbooks. Mainzer str. 25, D-555546 Hackenheim, Allemagne
conchbooks@conchbooks.de



Faut-il encore vous présenter cet ouvrage monumental qu'est "A Conchological Iconography" dont le but avoué est de réunir l'étude, si pas de toutes, du moins de la plupart des familles de mollusques récents.
Ce dernier volume en date nous familiarise avec la grande famille des Tonnidae dont l'auteur est un des plus éminents spécialistes. Après une courte préface où l'auteur nous parle de son but et de quelques exemples de difficultés rencontrées, le volume se poursuit par une diagnose de la famille, la biologie, l'habitat et la distribution, la position systématique des différents genres, l'historique fossile (par Alan G. Beu de Nouvelle-Zélande), l'histoire des Tonnidae dans les collections, les remerciements d'usage et les abréviations.
la partie systématique proprement dite débute avec le genre *Eudolium* qui renferme deux espèces, suivi par le genre *Malea* avec également deux espèces et le genre *Tonna* abritant 29 espèces, distribuées dans 7 complexes différents par l'auteur. La liste des espèces et de leurs synonymes est donnée pour chaque sous-famille.
Chaque espèce est présentée de la façon suivante: nom, auteur, date de description, synonymie, autres références bibliographiques, localité type, distribution, habitat, dimensions, description, comparaison et remarques. Le tout est agrémenté d'une photo noir et blanc de l'espèce et d'une carte illustrant la distribution géographique. De nombreux spécimens provenant du matériel type sont illustrés (holotypes, lectotypes, syntypes…). Le volume se termine par la bibliographie, en plus des références déjà données dans le texte, de l'index et des planches couleurs.
Les photographies couleurs sur fond noir agrémentant les 63 planches sont splendides et méritent une mention spéciale quant à leur qualité. Plusieurs spécimens sont illustrés pour chaque espèce, montrant ainsi la variabilité de la coquille, avec mention de la localité et de la taille.
Que dire face à une telle étude, si ce n'est que je la conseille vivement à tous ceux que les Tonnidae ne laissent pas indifférent. Une très bonne acquisition pour toute bibliothèque malacologique.

Roland Houart

Caracoles Terrestres de Andalucia
Guia y manual de identificacion

par A. Ruiz Ruiz, A. Carcaba Pozo, A.I. Porras Crevillen et J.R. Arrebola Burgos

pp. 1-303, plus de 100 planches couleurs.
Format 155 x 110 mm, couverture cartonnée.
Prix: 12 €

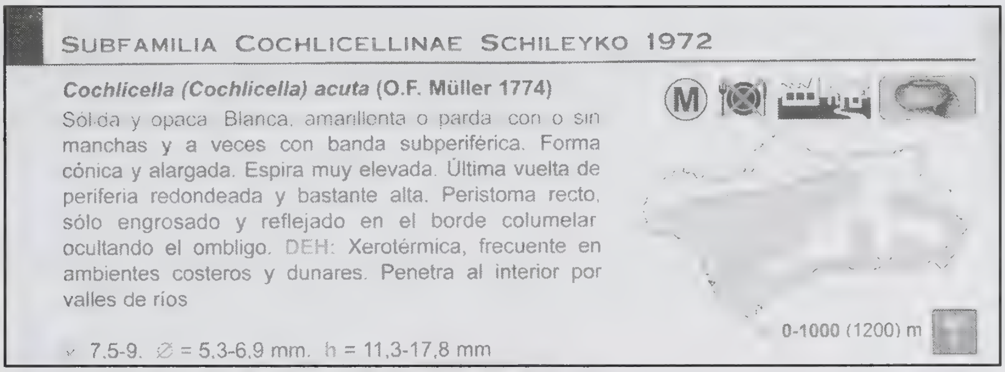
Editeur: Fundacion Gypaetus, Andalucia, Espagne
http://www.gypaetus.org/tienda.php

Caracoles Terrestres
de Andalucía
Guía
y manual de
identificación

Ce petit guide des Gastéropodes d'Andalousie est un gros bijou ! Est en effet ici illustrée et commentée la faune des escargots de cette province d'Espagne et ce l'est avec réussite. Car chaque espèce est tout d'abord décrite sans détails inutiles, mais avec assez de précision pour qu'une détermination soit possible – l'introduction de l'ouvrage a permis de préciser les termes employés (forme de la coquille, de l'ouverture, sculpture, dentition, etc). Suivent les dimensions et l'habitat. Enfin, au moyen d'une carte et de symboles prédéfinis, le lecteur trouve la distribution, le statut de l'espèce (en danger, vulnérable, de moindre préoccupation, etc), le fait d'être comestible, consommée ou pas, etc. Toutes les espèces sont représentées avec au moins deux vues, souvent trois et bon nombre d'espèces ont droit à une photo in situ.

Ce remarquable travail a été réalisé avec le concours de l'organisme officiel gérant l'environnement en Andalousie. Il le mérite bien : on le parcourrait rien que pour son plaisir. Le fait que le texte soit en espagnol n'est pas trop gênant pour un francophone : avec un dictionnaire, on rassemble vite le vocabulaire nécessaire si il le faut vraiment, car les photos parlent le plus souvent d'elles-mêmes !

Splendide ☺ !

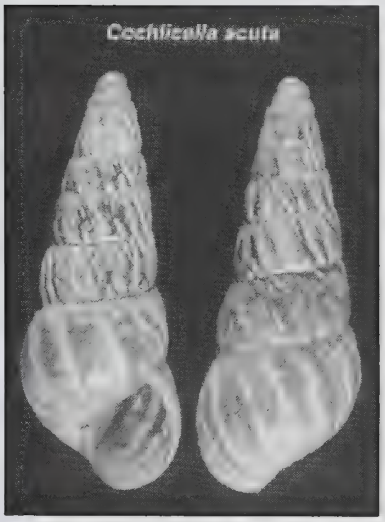


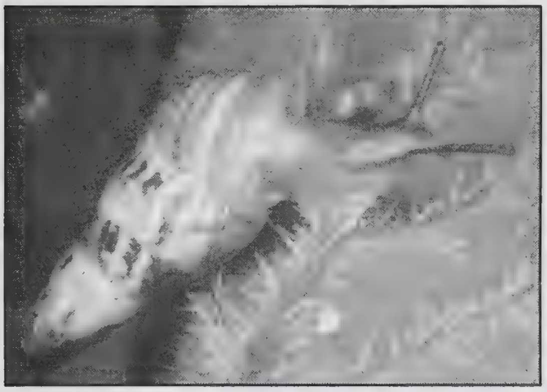
SUBFAMILIA COCHLICELLINAE SCHILEYKO 1972

Cochlicella (Cochlicella) acuta (O.F. Müller 1774)

Sólida y opaca. Blanca, amarillenta o parda, con o sin manchas y a veces con banda subperiférica. Forma cónica y alargada. Espira muy elevada. Última vuelta de periferia redondeada y bastante alta. Peristoma recto, sólo engrosado y reflejado en el borde columelar ocultando el ombligo. DEH: Xerotérmica, frecuente en ambientes costeros y dunares. Penetra al interior por valles de ríos

v 7,5-9. ⌀ = 5,3-6,9 mm. h = 11,3-17,8 mm





Claude Vilvens

2. Quelques articles

Pour rappel, il s'agit ici de publications ne se trouvant à la bibliothèque de la SBM, mais qu'il est possible de consulter à l'IRSNB et le plus souvent à l'ULB. On peut consulter Roland Houart à ce sujet.

Three New Pliocene Species of *Stramonita* Schumacher, 1817 (Muricidae: Rapaninae) from Western South America and the Evolution of Modern *Stramonita chocolata* (Duclos, 1832), par T. DeVries. *The Veliger* 48(4): 247-259 (2007).

* * *

An Outline of "Research on deep-sea Fauna and pollutants in Nansei Islands, 2001-2004", par G. Shinohara, K. Hasegawa, A. Go, K. Nakaguchi, H. Horikawa & M. Takeda. *Deep-sea Fauna and Pollutants in Nansei Islands. National Science Museum Monographs* n° 29: 1-15 (2005).

* * *

A Preliminary List of Deep-Sea Gastropods Collected from the Nansei Islands, Southwestern Japan, par K. Hasegawa. *Deep-sea Fauna and Pollutants in Nansei Islands. National Science Museum Monographs* n° 29: 137-190 (2005).

* * *

Sublittoral and Bathyal Shell-bearing Gastropods Chiefly Collected by the R/V *Rinkai-Maru* of the University of Tokyo Around the Miura Peninsula, Sagami Bay, 2001-2004, par K. Hasegawa. *Mem. Natn. Sci. Mus., Tokyo* (40): 225-281 (2006).

* * *

Nassarius tangaroi spec. nov., a species from the Marquesas Archipelago (Gastropoda, Caenogastropoda, Nassariidae), par H.H. Kool. *Basteria* 70: 97-100 (2006).

* * *

Nassarius samiae n.sp., a new deep water species from the Philippines (Gastropoda: Nassariidae). *Miscellanea Malacologica* 2 (1): 5-8 (2006).

* * *

Nassarius cadeii n.sp., a new species from South East Asia (Gastropoda: Nassariidae), par H.H. Kool. *Miscellanea Malacologica* 2 (2): 21-24 (2006).

* * *

The Early Pliocene Gastropoda (Mollusca) of Estepona, southern Spain. Part 7: Muricidae, par B. Landau, R. Houart et C.M. da Silva. *Palaeontos* 11: 1-87 (2007).

Une étude approfondie des mollusques du Pliocène Inférieur de Estepona, Espagne. La partie 7 concerne la famille des Muricidae. Nous vous livrons le résumé de cet important article.

Abstract: In this part of the series giving a systematic account of the Gastropoda of the Pliocene (Zanclean) deposits of Estepona, province of Málaga, Spain, the Muricidae are described and discussed. In this part the area of research has been widened to include material from two other SW Iberian Neogene basins, the Mondego Basin (western Portugal) and the Guadalquivir Basin (sowthwestern Spain). One new genus is described, *Cathymorula* nov gen. and three new taxa introduced, *Hexaplex (Truncularıopsis) praeduplex* nov. sp., *Ocenebra sublavata iberopliocenica* nov. subsp. and *Cathymorula cathyae* nov sp. Three of Bellardi's homonyms are renamed and lectotypes designated; *Purpura tuberculata* Bellardi, 1882 is renamed *Cathymorula bellardii* nov. nom., *P. bicarinata* Bellardi, 1882 is renamed *C. saccoi* nov. nom, and *P. elongata* Bellardi, 1882 is renamed *Purpura elongatobellardii* nov. nom. Lectotypes are designated for *Murex foliosus*, *M. gastraldii*, *M. trinodosus* Bellardi, 1873 and several new subjective synonymies suggested; *M. dujardini* Tournouër, 1875 junior synonym of *M. foliosus* Bellardi, 1873; *Pollia baccata*, *P. exacuta* and *P. affinis* Bellardi, 1873 junior synonyms of *Orania fusulus* (Brocchi, 1814); *Murex gastraldii* Bellardi, 1873, *M. cyclopterus* Millet, 1866 junior synonyms of *Purpurellus veranyi* (Paulucci, 1866); *Favartia incisa* auct. European fossil record *non* Broderip, 1833 is *F. suboblonga* (D'Orbigny, 1852). The palaeobiogeography of the Muricidae is discussed, and the strongly thermophilic character of many of the taxa highlighted. The family suffered dramatically from the gradual climatic cooling during the Pliocene. Of the 50 species recorded, only eight (16%) survived into the

Recent faunas, seven in the Mediterranean, and one, *Orania fusulus* (Brocchi, 1814), only at more southern latitudes, off the West African coast.

* * *

Marine Mollusca of oxygen isotope stages of the last 2 million years in New Zealand. Part 2. Biostratigraphically useful and new Pliocene to Recent bivalves, par A.G. Beu. *Journal of the Royal Society of new Zealand* 36 (4): 151-338 (2006).
Il s'agit d'un article imposant et très important pour ceux que les bivalves récents ou fossiles de laissent pas indifférents. Voici le résumé de cette étude. Pour en savoir plus: http://www.rsnz.org/publish/jrsnz/2004/007.php

Abstract New Zealand Plio-Pleistocene bivalves revised: *Limopsis*, oysters, *Pecten, Mactra (Maorimactra), Oxyperas, Lutraria, Austrovenus, Barnea, Myadora.* Recent Indo-West Pacific *Lutraria* species are reviewed; the Red Sea-East African species *L. (Lutraria) turneri* Jousseaume resembles *L. grandis* (Hutton) (adopted in place of the junior homonym *L. solida* Hutton). Six new species proposed: *Saccella maxwelli* (Nukumaruan-Recent; known previously as S. *bellula* (A. Adams)); *Limopsis turnbulli* (Castlecliffian, OIS 15-20, SW Fiordland); *Mactra (Maorimactra) marwicki* (late Nukumaruan); *M (Maorimactra) carteri* (early Castlecliffian, OIS 45?-19); *Paphies delta* (early Castlecliffian, OIS 31 ?-17); *Myadora fortecosta* (Kapitean-Opoitian). Further Indo-West Pacific warm-water migrants to New Zealand: *Chama ruderalis* Lamarck (Kapitean-Nukumaruan; = C. *huttoni* Hector, = C. *pittensis* Marwick); *Lutraria (Psammophila) vellai* (Beu) (late Nukumaruan); probably the two New Zealand late Neogene *Ctenoides* species. Further temperate migrant from the Atlantic: *Lutraria (Lutraria) grandis.* New synonymy: *Xenostrobus* Wilson = *Limnoperna* Rochebrune; *Pecten novaezelandiae* (Reeve) = all other New Zealand *Pecten* names; *Serratina eugonia* (Suter) = S. *charlottae* (E. A. Smith); *Oxyperas komakoensis* (Carter) = O. *elongata* (Quoy & Gaimard); *Austrovenus stutchburyi* (Wood) varies clinally over New Zealand, = *A. aucklandica* Powell, = *A. crassitesta* Finlay; *Dosinia (Austrodosinia) horrida* Marwick = *D. anus* (Philippi) (Nukumaruan-Recent); *Panopea wanganuica* Powell = *P. smithae* Powell (Nukumaruan-Recent); *Myadora stephaniae* Carter = *M waitotarana* Powell (Waipipian-Nukumaruan). Distinctive bivalves extinct at the end of Nukumaruan time: *Glycymeris shrimptoni* Marwick, *Patro undatus* (Hutton), *Lutraria (Lutraria) grandis, L. (Psammophila) vellai, Paphies crassiformis* (Marshall & Murdoch), *Eumarcia plana* Marwick, *Dosinia (Raina) nukumaruensis* Marwick, *Myadora waitotarana. Ennucula* Iredale is used for Cenozoic and Recent Nuculominae; the application of *Leionucula* Quenstedt is unclear. *Saccostrea glomerata* (Gould) is used in place of S. *circumsuta* (Gould). *Protothaca crassicosta* (Deshayes) (formerly Haweran-Recent) is recorded from Opoitian rocks. *Pecten novaezelandiae* appeared below Potaka Tephra (1.0 Ma) during OIS 29 or earlier in eastern New Zealand, but just above the Brunhes-Matuyama transition (0.78 Ma, early OIS 19) in Wanganui Basin. *Oxyperas elongata* and *Barnea similis* (Gray) changed anagenetically through late Miocene-Pleistocene time; earlier forms are conspecific with Recent ones. *Tawera* Marwick is restored as a genus. *Purpurocardia* Maxwell is compared with *Glans* Megerle von Muhlfeld and *Glyptoactis* Stewart, and all are retained. *Limnoperna huttoni* (Suter) became extinct during OIS 13, *Barytellina crassidens* Marwick during OIS 9 or younger. *Pholadidea tridens* (Gray) (OIS 23 & 5a) and *Ostreola virescens* (Angas, 1868) are recorded fossil

* * *

The protoconch of two scaphopod species from Japan, par T. sasaki. *Venus* 65(4): 319-323 (2007).

* * *

A new species of *Aliceia* (Gastropoda: Turridae) from Ogasawara Islands, Japan, par T. Sasaki & A. Warén. *Venus* 65(4): 369-371 (2007).

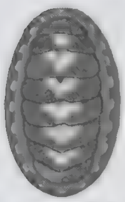
* * *

A new species of *Panacea* (Bivalvia: Pholadomyoidea: Parilimyidae) from Kanesunose Bank, off Central Japan, par T. sasaki & T. Okutani *Venus* 65(4): 372-374 (2007).

* * *

Anatomy of *Bathyacmaea secunda* Okutani, Fujikura & Sasaki, 1993 (Patellogastropoda: Acmaeidae), par T. Sasaki, T. Okutani & K. Fujikura. *Journal of Molluscan Studies* 72: 295-309 (2006).

Roland Houart



Morceaux choisis

Claude VILVENS

Le moins que l'on puisse dire, c'est que le magazine scientifique La Recherche y a mis un coup concernant les grandes questions portant sur le Vie. Jugez-en plutôt …

1. Les Dossiers de la Recherche n°27 (mai-juillet 2007). L'évolution – Comment les espèces s'adaptent.

Le sommaire ci-dessous peut en convaincre : ce numéro brosse un panorama complet des différentes concepts qui soutiennent le mécanisme de l'évolution (le sous-titre du sommaire est d'ailleurs : "Les moteurs de l'évolution"). Soulignons notamment "L'arbre des penseurs" (pp.10-11) qui reprend les grands noms des théoriciens de l'évolution (comme Haeckel, Mayr ou Gould) avec un résumé de leur point de vue, "La sélection naturelle" (pp.12-15) qui explique comment la Phalène du Bouleau (un papillon) peut à la fois argumenter en faveur des théories évolutionnistes et créationnistes, un magnifique portfolio "L'œil s'est-il construit pas à pas ?" (pp.34-39) avec de splendides photos (ici, une Coquille St Jacques et un Nautile) et les nouvelles idées au sein du darwinisme exposées dans "Le darwinisme évolue aussi" (pp.40-45).

ENTRETIEN PIERRE-HENRI GOUYON
« Pourra-t-on un jour prédire le passé ? »

INFOGRAPHIE
L'arbre des penseurs

LA SELECTION NATURELLE MICHAEL E.N. MAJERUS
Le papillon de la discorde

LE TEMPS EMMANUEL DOUZERY ET NICOLAS GALTIER
À quelle vitesse changent nos gènes

LA REPRODUCTION SEXUÉE DENIS FOURNIER ET SERGE ARON
Le sexe, si nécessaire

L'ISOLEMENT PIERRE CAPY
« Les preuves de la spéciation sans frontières »

L'ENVIRONNEMENT VINCENT DEBAT
Comment le milieu sculpte les gènes

PORTFOLIO OLIVIER DONNARS
L'œil s'est-il construit pas à pas ?

L'ENVIRONNEMENT EVA JABLONKA
Le darwinisme évolue aussi

LE BRICOLAGE BERNARD DUTRILLAUX
Une autre manière de créer des espèces

LA COMPÉTITION ELIZABETH PENNISI
Le bec du pinson des Galápagos

LA COOPERATION MICHEL CHAPUISAT ET LAURENT KELLER
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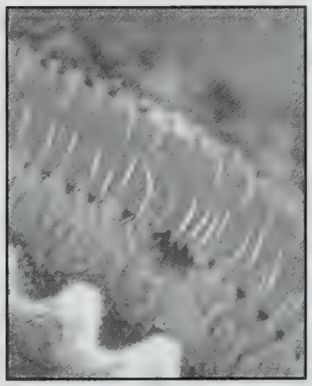
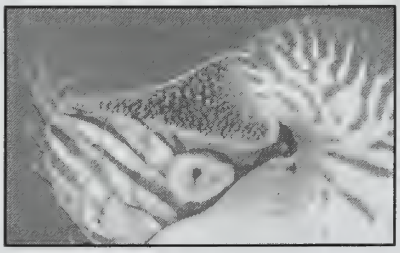




Voici bien le genre de dossier que tout naturaliste se doit de posséder dans sa bibliothèque ☺. Comme d'ailleurs le suivant …

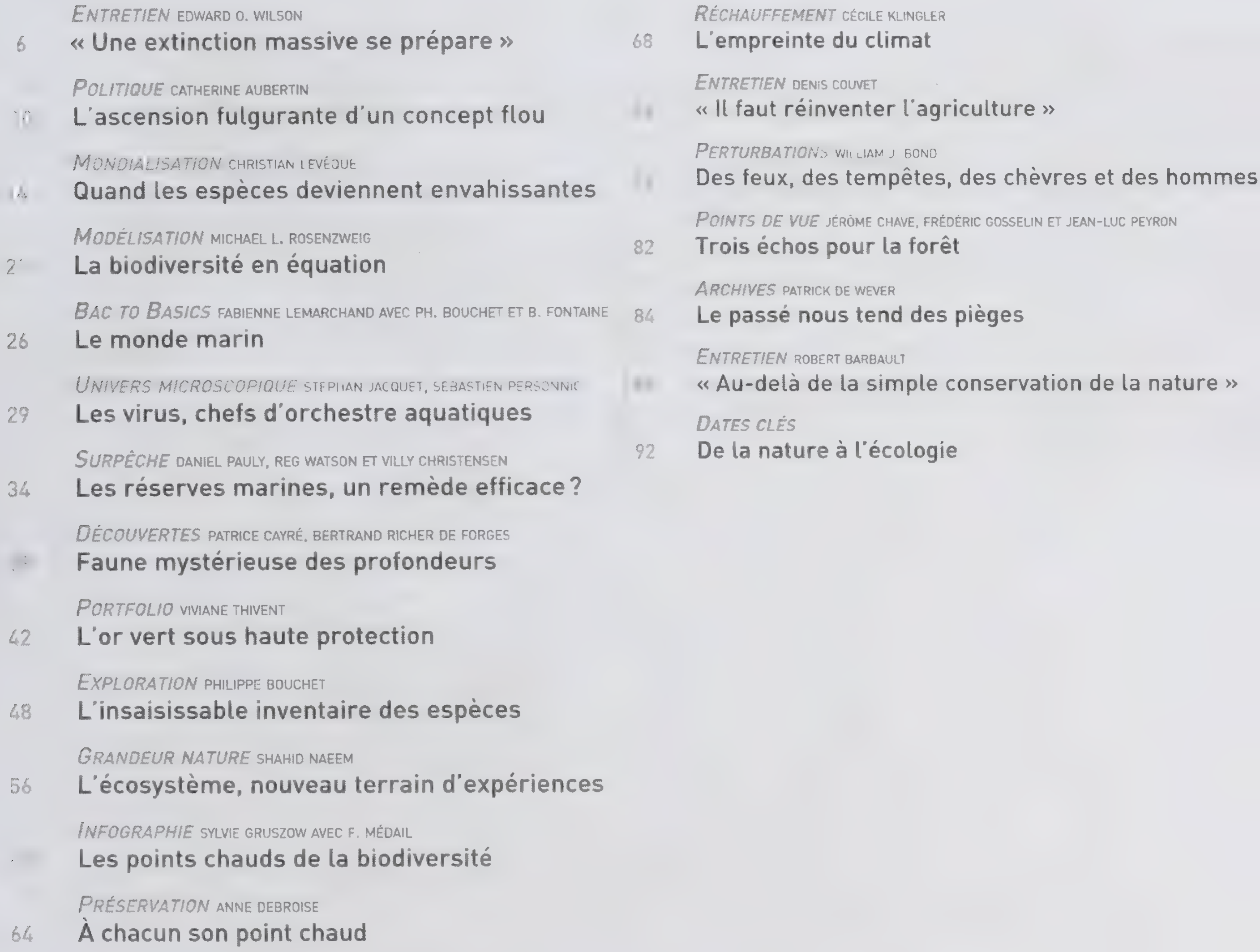
2. Les Dossiers de la Recherche n°28 (août-octobre 2007). Biodiversité – Les menaces sur le vivant.

Voici bien sûr un sujet fort "à la mode". Mais comme tout cela est passionnant : le sommaire peut nous convaincre que la plupart des facettes du sujet sont abordées par des spécialistes compétents. De notre point de vue de malacologues collaborant avec le MNHN de Paris, on ne peut pas ne pas signaler

♦ "Le monde marin" par F. Lemarchand avec Ph. Bouchet et B. Fontaine (pp.26-28) – sans doute ne faut-il pas vous présenter Philippe Bouchet, professeur au MNHN : ici se trouvent les réponses succinctes à 7 questions portant sur la biodiversité marine, comme par exemple "En quoi la biodiversité marine se distingue-t-elle de sa cousine terrestre ?" ou "Les effets du réchauffement climatique sont-ils déjà perceptibles ?";

♦ "Faune mystérieuse des profondeurs" par P. Cayré et B. Richer de Forges (pp.38-41) – ce dernier est un représentant bien connu de l'IRD (l'ex ORSTOM) en Nouvelle Calédonie : sont ici présentées des espèces bien peu connues, comme par exemple un isopode (Crustacé) de 40 cm de long, alors que les espèces de ce groupe ne dépassent jamais quelques mm !

♦ "L'insaisissable inventaire des espèces" par Ph; Bouchet (pp. 48-55) : on va retrouver ici les thèmes que l'auteur avait développés lors de sa conférence donnée au cours du 40ème anniversaire de la SBM en 2006, soit donc la description des nouvelles espèces et leur publication (avec la problématique du "handicap taxonomique", ce goulet d'étranglement résultant du fait que les moyens humains sont bien trop faibles pour tout inventorier dans un délai raisonnable), le nombre d'espèces existant et les nouvelles perspectives apportées par des biotopes comme les sources chaudes ou le monde souterrain. A signaler aussi la "Fauna Europea", programme visant à constituer une base de données contenant toutes les espèces terrestres et d'eau douce d'Europe (de l'ordre de 140 000), avec son Top 10 des espèces nouvelles récentes illustrées dans l'article (voir http://www.faunaeur.org/).



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Voici bien le genre de dossier que tout naturaliste se doit de posséder dans sa bibliothèque ☺ [bis]

3. La Recherche: n°409 – juin 2007 – Dossier : Il y a 250 millions d'années : La plus grande extinction du vivant (pp.30-49)

❶ Quand la vie faillit disparaître p. 31
❷ Le Permien au Sahara p. 36
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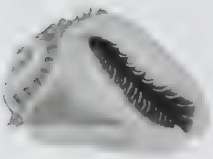
Ce dossier se donne comme objectif de décrire et d'analyser ce qu'il est convenu de considérer comme la plus grande catastrophe biologique qu'ait connu la Terre : la grande extinction du Permien il y a 250 millions d'années. On sait que 85 à 90% des espèces, du moins marines, ont failli disparaître. Les questions qui se posent sont de savoir si cette extinction fut brutale ou graduelle, si tous les groupes ont été touchés de la même manière, pourquoi la vie a repris spectaculairement et, bien sûr, de découvrir les causes de cette catastrophe. En fait, répondre à ces questions n'est pas simple. Ainsi, par exemple, il faut prendre en compte l'effet Lazare des Gastéropodes : ils semblent disparaître à la fin du Permien après un déclin progressif, puis réapparaissent au Trais moyen : véritable évolution ou simple déficit de fossiles probants ?



Nous avons reçu

Claude VILVENS

GLORIA MARIS

(Belgique néerlandophone)
Vol. 45, N°6, janvier 2007

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   Red Sea Mollusca part 24: Conidae

2. *Monsecour K. & Monsecour D.*
   Annotated list of columbellid species described by M.M. Schepman held in the malacological collection of the Zoölogisch Museum Amsterdam (Mollusca, Caenogastropoda, Columbellidae)

LES NATURALISTES BELGES

(Belgique)
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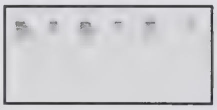

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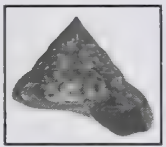
(Taïwan)
Vol. 30, décembre 2006



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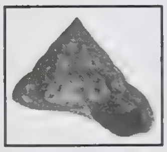
(Taïwan)
N°32, décembre 2006



Intégralement en chinois, sauf les noms d'espèces, les mesures et les images ;-) Parmi celles-ci, il faut mentionner les 5 belles planches couleurs illustrant les Triphoridae.

THE BULLETIN OF THE RUSSIAN FAR EAST MALACOLOGICAL SOCIETY

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Vol. 10, 2006

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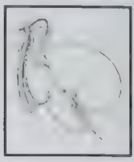

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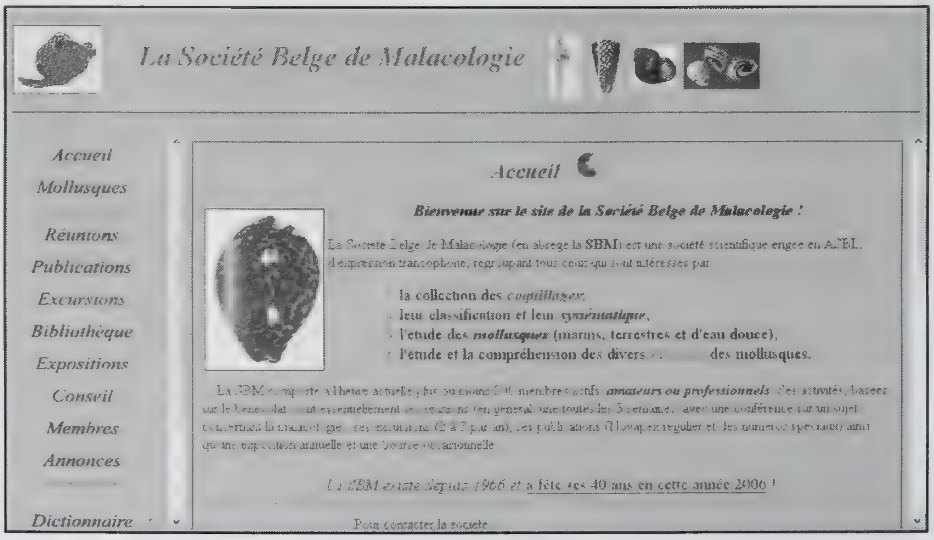
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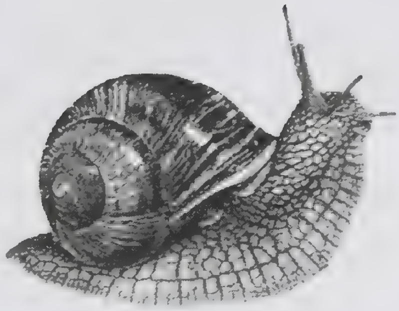

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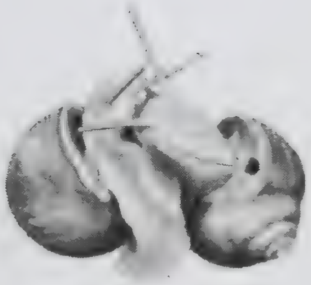

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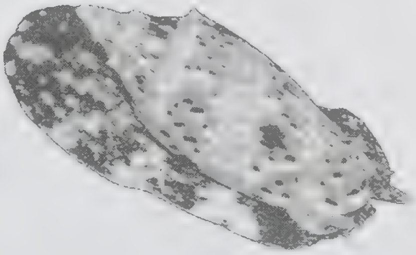

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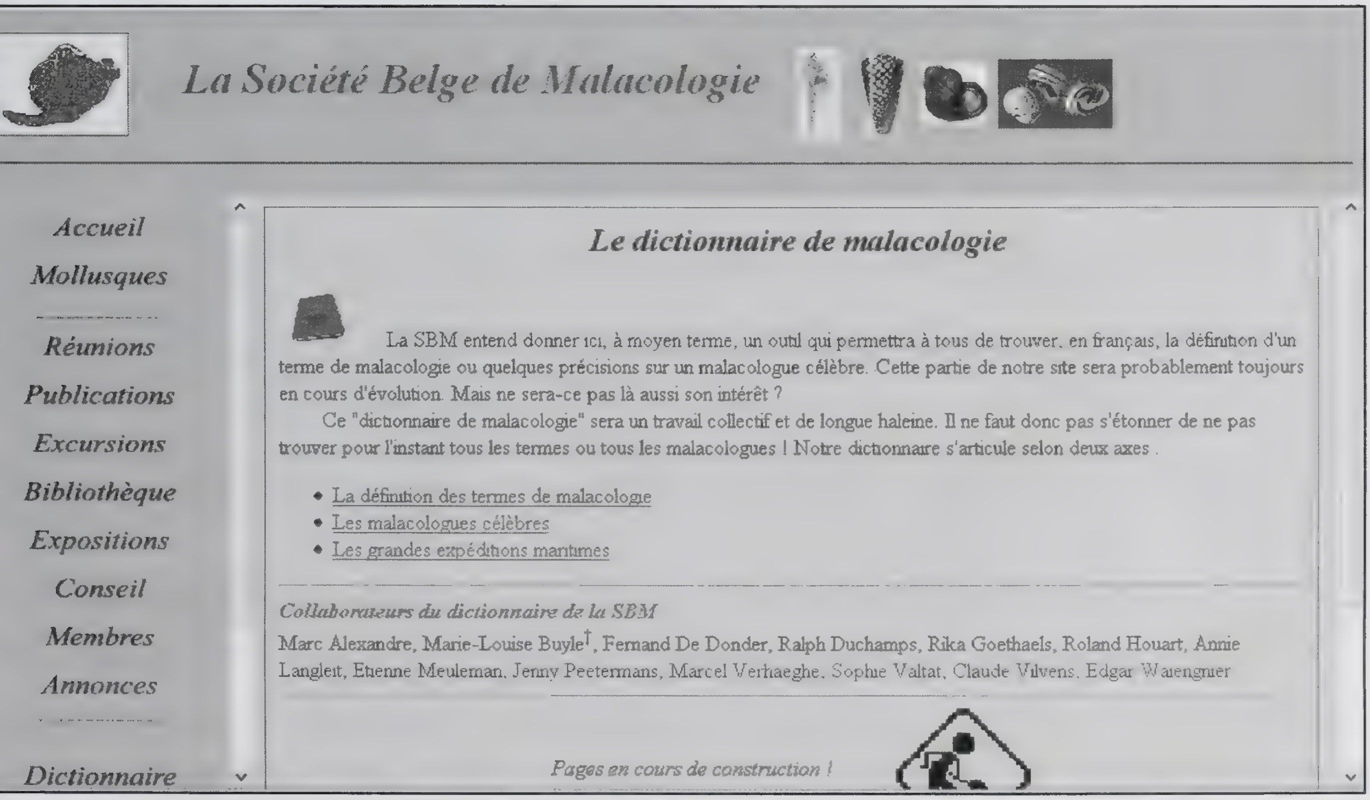

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New species and new records of *Calliotropis* (Gastropoda: Chilodontidae: Calliotropinae) from Indo-Pacific

Claude VILVENS

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New species and new records of *Calliotropis* (Gastropoda: Chilodontidae: Calliotropinae) from Indo-Pacific

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KEYWORDS. Gastropoda, Chilodontidae, New Caledonia, Fiji, Vanuatu, Tonga, Solomon, Indonesia, Taiwan, Marquesas, *Calliotropis* n. sp., *Calliotropis* n. ssp., Trochidae.

ABSTRACT. New records of 25 *Calliotropis* species from the Indo-Pacific area are listed, extending the distribution area of some of them. 30 new species and 1 new subspecies are described and compared with similar *Calliotropis* species : *C. conoeides* n. sp.; *C. helix* n. sp.; *C. cynee* n. sp.; *C. chalkeie* n. sp.; *C. ptykte* n. sp.; *C. solomonensis* n. sp.; *C. pistis* n. sp.; *C. echidnoides* n. sp.; *C. cycloeides* n. sp.; *C. pyramoeides* n. sp.; *C. coopertorium* n. sp.; *C. asphales* n. sp.; *C. nux* n. sp.; *C. oros* n. sp.; *C. oros marquisensis* n. ssp.; *C. zone* n. sp.; *C. hysterea* n. sp.; *C. stegos* n. sp.; *C. oregmene* n. sp.; *C. cooperculum* n. sp.; *C. keras* n. sp.; *C. denticulus* n. sp.; *C. dicrous* n. sp.; *C. rostrum* n. sp.; *C. pheidole* n. sp.; *C. siphaios* n. sp.; *C. nomisma* n. sp.; *C. nomismasimilis* n. sp.; *C. elephas* n. sp.; *C. ostrideslithos* n. sp.; *C. trieres* n. sp.

RESUME. De nouveaux relevés de 25 espèces de *Calliotropis* provenant de la région Indo-Pacifique sont listés, étendant ainsi l'aire de distribution d'un certain nombre d'entre elles. 30 nouvelles espèces et 1 nouvelle sous-espèce sont décrites et comparées avec des espèces similaires de *Calliotropis* : *C. conoeides* n. sp.; *C. helix* n. sp.; *C. cynee* n. sp.; *C. chalkeie* n. sp.; *C. ptykte* n. sp.; *C. solomonensis* n. sp.; *C. pistis* n. sp.; *C. echidnoides* n. sp.; *C. cycloeides* n. sp.; *C. pyramoeides* n. sp.; *C. coopertorium* n. sp.; *C. asphales* n. sp.; *C. nux* n. sp.; *C. oros* n. sp.; *C. oros marquisensis* n. ssp.; *C. zone* n. sp.; *C. hysterea* n. sp.; *C. stegos* n. sp.; *C. oregmene* n. sp.; *C. cooperculum* n. sp.; *C. keras* n. sp.; *C. denticulus* n. sp.; *C. dicrous* n. sp.; *C. rostrum* n. sp.; *C. pheidole* n. sp.; *C. siphaios* n. sp.; *C. nomisma* n. sp.; *C. nomismasimilis* n. sp.; *C. elephas* n. sp.; *C. ostrideslithos* n. sp.; *C. trieres* n. sp.

INTRODUCTION

Numerous species belong to the genus *Calliotropis* : about 50 valid species live in the only Indo-Pacific area. Most of these species live at rather great depth (few hundred meters), some species even living in greater depth (over 1000 m). So, it is understandable that some new species have been discovered only recently during new deep water dredging campaigns (Rehder et Ladd, 1973; Marshall, 1979; Lan, 1990; Jansen, 1994; Lee & Wu, 2001; Vilvens, 2004, 2005, 2006; Poppe et al., 2006). In the same way, the distribution area of well-known species, primitively rather restricted, has been extended to other areas, sometimes far away from the original locality.

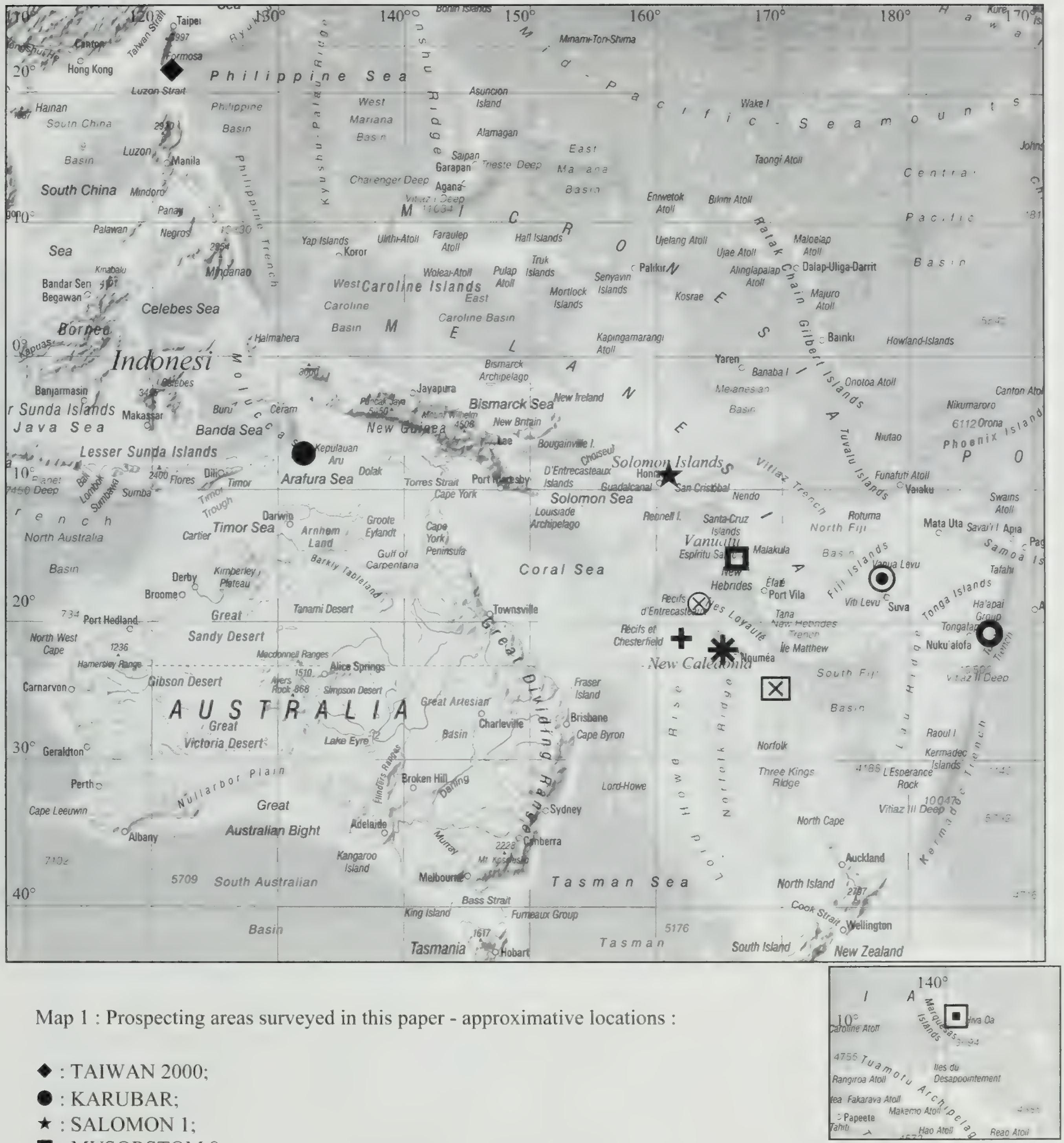
For the last twenty years, numerous French expeditions conducted by the IRD (Institut de Recherche pour le Développement, Paris - ex-ORSTOM) and the MNHN (Muséum national d'Histoire naturelle, Paris) have taken place in a large Indo-Pacific area, from Taiwan, Indonesia and Philippines to Solomon Islands, New Caledonia, Fiji, Vanuatu and even far away up to Tonga and Marquesas Islands. They have brought a huge deep water material of highly scientific interest, among others various trochids, especially *Calliotropis* species. Some new species have already been described from this material (Vilvens, 2004, 2005, 2006; Poppe et al., 2006). The present paper propose a synthetic report on most of the species of *Calliotropis* collected during these French expeditions, describing 30 new species (and 1 new susbspecies) and extending the distribution area of 25 known species. The variability of some of these species is discussed here. A list of the Recent *Calliotropis* species of the Indo-Pacific area, with their respective distribution, is also provided as appendix at the end of this paper.

Material and methods. The material studied in this paper was brought by French IRD-MNHN expeditions in a large Indo-Pacific area, covering mainly Taiwan, Indonesia, Solomon Islands, New Caledonia, Fiji, Vanuatu, Tonga and Marquesas Islands. The following table lists these campaigns :

Campaign	Prospecting area	Date (m/y)
VAUBAN 1978-79	New Caledonia	1978-1979
LAGON	New Caledonia	5,8-12/1984
CHALCAL 1	Chesterfield plateau	7/1984
BIOCAL	Southern New Caledonia and Iles Loyauté	8-9/1985
MUSORSTOM 4	New Caledonia	9-10/1985
SMIB 1	Southern New Caledonia	2/1986
SMIB 2	Southern New Caledonia	9/1986
MUSORSTOM 5	Chesterfield Is., Guyots of Lord Howe ridge	10/1986
CHALCAL 2	Southern New Caledonia and Norfolk ridge	10-11/1986
BIOGEOCAL	Loyalty Basin	4-5/1987
SMIB 3	Southern New Caledonia and Norfolk ridge	5/1987
CORAIL 2	Chesterfield Is., Lansdowne and Fairway banks	7-8/1988
MUSORSTOM 6	Loyalty ridge	2/1989
VOLSMAR	Loyalty Ridge	5-6/1989
SMIB 5	Loyalty Ridge	9/1989
CALSUB	Iles Loyauté	2-3/1989
SMIB 6	New Caledonia	3/1990
KARUBAR	Indonesia	10-11/1991
BERYX 11	Norfolk Ridge and Loyalty Ridge	10/1992
SMIB 8	Norfolk Ridge	1-2/1993
BATHUS 1	Eastern New Caledonia	3/1993
BATHUS 2	Southern New Caledonia	5/1993
MONTROUZIER	New Caledonia, Koumac sector	10/1993
BATHUS 3	New Caledonia, Norfolk Ridge	11/1993
HALIPRO 1	Southern New Caledonia	3/1994
BATHUS 4	New Caledonia	8/1994
MUSORSTOM 8	Vanuatu	9-10/1994
HALICAL 1	New Caledonia	11-12/1994
HALIPRO 2	Norfolk Ridge and Loyalty Ridge	11/1996
MUSORSTOM 9	Marquesas Islands	8-9/1997
MUSORSTOM 10	Fiji Islands	8/1998
BORDAU 1	Fiji Islands	2-3/1999
PALEO-SURPRISE	Northern New Caledonia	4-5/1999
LITHIST	Southern New Caledonia	8/1999
BORDAU 2	Tonga Islands	6/2000
TAIWAN 2000	Taïwan	7-8/2000
LIFOU 2000	Iles Loyauté	10-11/2000
NORFOLK 1	New Caledonia, Norfolk Ridge	6/2001
SALOMON 1	Solomon Islands	9/2001

Table 1. – List of the Indo-Pacific MNHN campaigns mentioned.

Regarding the MNHN campaigns throughout Philippines (MUSORSTOM 1-2-3, ESTASE), see Poppe et al. (2006) and in the south-western Indian Ocean (BENTHEDI, MD-32...), see Vilvens (2005 & 2006).


110°
120°
130°
140°
150°
160°
170°
180°
170°
20°
10°
0°
10°
20°
30°
40°
Taipei
Formosa
Hong Kong
Canton
Luzon Strait
Hainan
South China Basin
Luzon
Manila
South China Sea
Mindoro
Panay
Palawan
Negros
Mindanao
Philippine Basin
Philippine Trench
Philippine Sea
Kyushu-Palau Ridge
West Mariana Basin
Asuncion Island
Alamagan
Saipan
Garapan
Agana
Challenger Deep
Trieste Deep
East Mariana Basin
Minami-Tori-Shima
Mid-Pacific Seamounts
Wake I.
Taongi Atoll
Enewetok Atoll
Bikini Atoll
Central Pacific Basin
Yap Islands
Koror
Ulithi-Atoll
Faraulep Atoll
Hall Islands
Truk Islands
Woleai-Atoll
Pulap Atoll
West Caroline Basin
Caroline Islands
East Caroline Basin
Mortlock Islands
Senyavin Islands
Palikir
Ujelang Atoll
Ujae Atoll
Ailinglapalap Atoll
Maloelap Atoll
Dalap-Uliga-Darrit
Majuro Atoll
Ratak Chain
Kosrae
MICRONESIA
Kapingamarangi Atoll
Bairiki
Howland-Islands
Gilbert Islands
Yaren
Banaba I.
Onotoa Atoll
Canton Atoll
Nikumaroro
Orona
Phoenix Islands
Celebes Sea
Borneo
Bandar Seri Begawan
Halmahera
Indonesia
Banjarmasin
Celebes
Makassar
Sunda Islands
Java Sea
Buru
Ceram
Banda Sea
Moluccas
Lesser Sunda Islands
Bali
Lombok
Sumbawa
Sumba
Flores
Dili
Timor
Timor Trough
Timor Sea
Kepulauan Aru
Arafura Sea
Dolak
Jayapura
New Guinea
Bismarck Archipelago
Bismarck Sea
New Ireland
New Britain
Lae
Bougainville I.
Choiseul
Solomon Islands
Honiara
San Cristobal
Guadalcanal
D'Entrecasteaux Islands
Port Moresby
Torres Strait
Cape York
Solomon Sea
Louisiade Archipelago
Rennell I.
Nendo
Santa-Cruz Islands
Vitiaz Trench
Tuvalu Islands
Niutao
Funafuti Atoll
Vaiaku
Rotuma
North Fiji Basin
Vanuatu
Espiritu Santo
Malakula
New Hebrides
Efate
Port Vila
Fiji Islands
Vanua Levu
Viti Levu
Suva
Swains Atoll
Mata Uta
Savai'i
Apia
Samoa Islands
Tafahi
Tonga Islands
Ha'apai Group
Tongatapu
Nuku'alofa
Tonga Trench
Vitiaz II Deep
Coral Sea
Récifs d'Entrecasteaux
Îles Loyauté
Récifs et Chesterfield
New Caledonia
Nouméa
New Hebrides Trench
Île Matthew
South Fiji Basin
Fraser Island
Brisbane
Cape Byron
Lord-Howe
Lord Howe Rise
Norfolk Ridge
Norfolk
Three Kings Ridge
Raoul I.
Kermadec Islands
L'Esperance Rock
Kermadec Trench
Vitiaz III Deep
North Cape
Auckland
North Island
Cook Strait
Wellington
South Island
New Zealand
Darwin
Arnhem Land
Groote Eylandt
Gulf of Carpentaria
Cape York Peninsula
Barkly Tableland
Cartier
North Australia Basin
Derby
Broome
Kimberley Plateau
Port Hedland
North West Cape
Hamersley Range
Great Sandy Desert
Tanami Desert
Townsville
Macdonnell Ranges
Alice Springs
Ayers Rock
Simpson Desert
Carnarvon
Gibson Desert
AUSTRALIA
Great Artesian Basin
Charleville
Great Victoria Desert
Lake Eyre
Geraldton
Great Dividing Range
Perth
Nullarbor Plain
Flinders Ranges
Broken Hill
Darling
Sydney
Cape Leeuwin
Albany
Great Australian Bight
Adelaide
Murray
Canberra
Mt Kosciusko
Kangaroo Island
South Australian Basin
Melbourne
Bass Strait
King Island
Furneaux Group
Tasmania
Hobart
Tasman Sea
Tasman Basin
140°
10°
Caroline Atoll
Marquesas Islands
Tuamotu Archipelago
Rangiroa Atoll
Îles du Désappointement
Fakarava Atoll
Makemo Atoll
Papeete
Tahiti
Hao Atoll
Reao Atoll

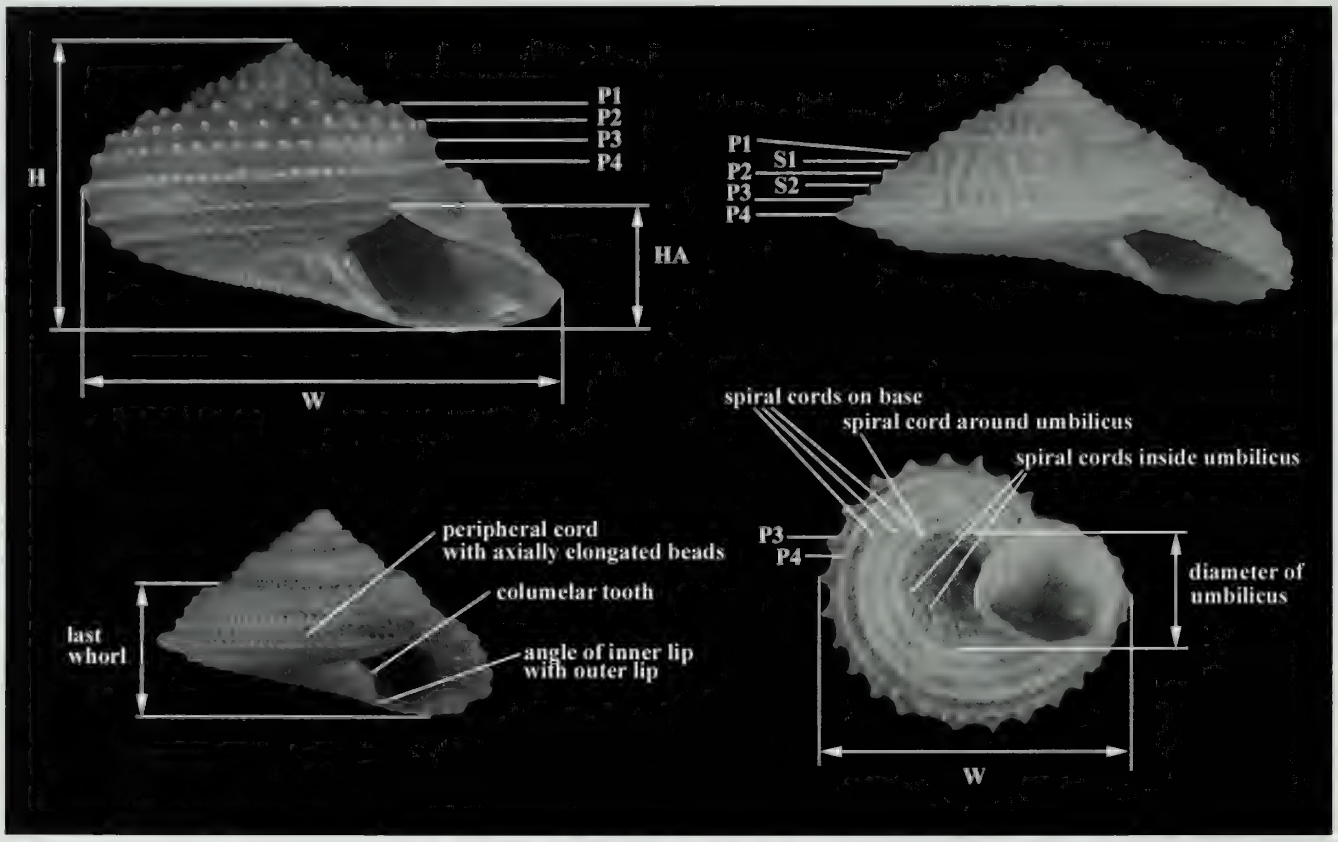
Map 1 : Prospecting areas surveyed in this paper - approximative locations :

◆ : TAIWAN 2000;
● : KARUBAR;
★ : SALOMON 1;
□ : MUSORSTOM 8;
⦿ : MUSORSTOM 10, BORDAU 1;
⊡ : MUSORSTOM 9;
○ : BORDAU 2;
✚ : CHALCAL 1, MUSORSTOM 5, CORAIL 2;
⊗ : PALEO-SURPRISE;
✱ : LAGON, BIOCAL, MUSORSTOM 4, SMIB 1, SMIB 2, BIOGEOCAL, MUSORSTOM 6, VOLSMAR, SMIB 5, CALSUB, SMIB 6, BATHUS 1, BATHUS 2, MONTROUZIER, BATHUS 3, HALIPRO 1, BATHUS 4, HALICAL 1, LITHIST, LIFOU 2000, NORFOLK 1;
⊠ : CHALCAL 2, SMIB 3, BERYX 11, SMIB 8, HALIPRO 2.

Regarding the distribution of the new species and the extension of the distribution of known species, the range is taken from the internal intervals of the two extremes values.

As for the description methodology, the main conchological features used are (see sch. 1 below) :

- general shape of the shell (depressed, high spired - cyrtoconoidal, conical, coeloconoidal);
- shape of the whorls (convex, concave, straight - with or without shoulder or keel);
- spiral cords of the whorls (ontogeny, number, beads, distance between);
- spiral cords on the base (number, beads, distance between);
- spiral cords within the umbilicus (number);
- shape of the aperture, the outer and inner lip.



Schema 1 : Useful features of *Calliotropis* shells; H : height; W : width; HA : height of the aperture; P1, P2, P3, ... : primary cords; S1, S2, S3, ... : secondary cords.

Considering the relatively poor anatomical information about *Calliotropis* species, no subgenus has been described on such considerations. So by now only conchological features was used to define subgenera. In original descriptions we can only find the subgenera *Solaricida* Dall, 1919 (characterized by a depressed spire and a broad umbilicus - although the type species *Solariella (Solaricida) hondoensis* Dall, 1919 has precisely a not so wide umbilicus) and *Adamsenida* Habe, 1952 (with *Enida gemmulosa* A.Adams, 1860 as type species - this subgenus is vaguely characterized by strong spiral cords on whorls, a convex base and a wide umbilicus). Poppe et al. (2006) described 2 new subgenera : *Schepmanotropis* (type species : *Solariellopsis calcarata* Schepman, 1908) and *Spinicalliotropis* (type species : *C. spinosa* Poppe, Tagaro & Dekker, 2006). This survey neither defines new subgenera nor uses existent ones because the range of variations of *Calliotropis* shells seems too wide to allow the use of only conchological features without anatomical (especially radula) considerations.

Species are here listed following on an order based upon the height (H) and the height/width ratio (H/W) of the shell (using the mean of these values computed for available specimens). So eight formal groups can be distinguished : large (H>=15 mm), rather small 6<=H<15 mm) and small shells (H<6 mm) with an elevated spire (H/W>=1), large and rather small shells with a rather elevated spire (0.7<ratio<1), and rather small and small shells with a rather depressed spire (ratio<=0.7). Within each group, the known species are listed before the related new species, so that the comparisons in descriptions of new species could be easier to understand. Such an order may look arbitrary, but if helps to locate the different species through the paper. More precisely :

species	H (mm)	H/W	page
Formal group 1 : large shell (H>=15) with elevated spire (H/W>=1)			
Calliotropis pagodiformis (Schepman, 1908)	23.5	1.15	p.7
Calliotropis conoeides n. sp.	31.5	1.24	p.7
Calliotropis excelsior Vilvens, 2004	24.4	1.18	p.8
Calliotropis helix n. sp.	19.8	1.05	p.8
Calliotropis cynee n. sp.	16.2	1.18	p.10
Calliotropis infundibulum (Watson, 1879)	20	1.04	p.11
Calliotropis hataii Rehder & Ladd, 1973	16	1	p.12
Formal group 2 : rather small shell (6<=H<15) with elevated spire (H/W>=1)			
Calliotropis chalkeie n. sp.	6.5	1.26	p.12
Formal group3 : small shell (H<6) with elevated spire (H/W>=1)			
Calliotropis acherontis Marshall, 1979	5.2	1.42	p.15
Calliotropis crystalophora Marshall, 1979	4.5	1.33	p.15
Calliotropis ptykte n. sp.	4.1	1.31	p.16
Calliotropis lamellifera Jansen, 1994	4.8	1.19	p.18
Calliotropis multisquamosa (Schepman, 1908)	5.5	1.1	p.20
Calliotropis solomonensis n. sp.	4.5	1.09	p.20
Calliotropis echidnoides n. sp.	4.8	1.02	p.22
Calliotropis stanyii Poppe, Tagaro & Dekker, 2006	5.5	1	p.23
Formal group 4 : large shell (H>=15) with moderately elevated spire (0.7<H/W<1)			
Calliotropis derbiosa Vilvens, 2004	22.3	0.9	p.24
Calliotropis micraulax Vilvens, 2004	20.5	0.9	p.24
Calliotropis midwayensis (Lan, 1990)	21.3	0.89	p.24
Calliotropis asphales n. sp.	23.8	0.87	p.26
Calliotropis glypta (Watson, 1879)	20	0.86	p.28
Calliotropis basileus Vilvens, 2004	21.8	0.85	p.28
Formal group 5 : rather small shell (6<=H<15) with moderately elevated spire (0.7<H/W<1)			
Calliotropis blacki Marshall, 1979	11.5	0.86	p.28
Calliotropis pistis n. sp.	10.1	0.8	p.29
Calliotropis boucheti Poppe, Tagaro & Dekker, 2006	12.7	0.76	p.30
Calliotropis dicrous n. sp.	10.2	0.81	p.30
Calliotropis scalaris Lee & Wu, 2001	6	0.75	p.32
Calliotropis denticulus n. sp.	7.4	0.73	p.33
Formal group 6: small shell (H<6) with moderately elevated spire (0.7<H/W<1)			
Calliotropis delli Marshall, 1979	5.6	0.99	p.34
Calliotropis pyramoeides n. sp.	3.6	0.95	p.36

Calliotropis coopertorium n. sp.	2.9	0.83	p.37
Calliotropis oros n. sp.	5.4	0.78	p.38
Calliotropis hysterea n. sp.	5.8	0.77	p.40
Calliotropis zone n. sp.	4.8	0.77	p.41
Calliotropis oregmene n. sp.	5.7	0.76	p.43
Calliotropis cycloeides n. sp.	5	0.73	p.44
Formal group 7 : rather small (6<=H<15) shell with rather depressed spire (H/W<=7)			
Calliotropis eucheloides Marshall, 1979	8.5	0.7	p.46
Calliotropis nux n. sp.	11	0.7	p.49
Calliotropis limbifera (Schepman, 1908)	7.4	0.69	p.50
Calliotropis pulchra (Schepman, 1908)	7.9	0.55	p.52
Calliotropis oros marquisensis n. ssp.	7	0.67	p.52
Calliotropis keras n. sp.	13.6	0.64	p.52
Calliotropis elephas n. sp.	8.3	0.63	p.54
Calliotropis rostrum n. sp.	8.7	0.57	p.56
Calliotropis nomisma n. sp.	10.2	0.55	p.57
Formal group 8 : small shell (H<6) with rather depressed spire (H/W<=7)			
Calliotropis bucina Vilvens, 2006	3.8	0.68	p.58
Calliotropis stegos n. sp.	5	0.66	p.58
Calliotropis cooperculum n. sp.	5	0.66	p.59
Calliotropis trieres n. sp.	2.9	0.63	p.62
Calliotropis vilvensi Poppe, Tagaro & Dekker, 2006	2.7	0.56	p.63
Calliotropis siphaios n. sp.	5.2	0.59	p.63
Calliotropis calcarata (Schepman, 1908)	5.2	0.58	p.64
Calliotropis ostrideslithos n. sp.	3.8	0.58	p.64
Calliotropis nomismasimilis n. sp.	5.2	0.57	p.65
Calliotropis pheidole n. sp.	2.7	0.53	p.68
Calliotropis spinulosa (Schepman, 1908)	4.3	0.49	p.67

Table 2. – List of the species mentioned.

Abbreviations

Repositories

AMS : Australian Museum, Sydney, Australia.
IRSNB : Institut royal des Sciences naturelles de Belgique, Bruxelles, Belgium.
MNHN : Muséum national d'Histoire naturelle, Paris, France.
MZB : Museum Zoologicum Bogoriense, Bogor, Indonesia.
NHM : Natural History Museum, London, England.
NMNZ : National Museum of New Zealand Te Papa Tongarewa, Wellington, New Zealand.
NTOU : National Taiwan Ocean University, Taiwan.
RMBR : Raffles Museum of Biodiversity Research, Singapore.
ZMA : Zoölogisch Museum, Amsterdam, The Netherlands.

Other abbreviations

H : height.
W : width.
HA : height of the aperture.
TW : number of teleoconch whorls.
P1, P2, P3, : primary cords (P1 is the most adapical).
S1, S2, S3, : secondary cords (S1 is the most adapical).

stn : station.
lv : live-taken specimens present in sample.
dd : no live-taken specimens present in sample.
sub : subadult specimen.
juv : juvenile specimen .

SYSTEMATICS

We follow here the classification of Bouchet & Rocroi (2005), where Calliotropini, earlier treated as a tribe of Trochidae (Hickman & McLean, 1990), are now ranked as a subfamily of family Chilodontidae.

Superfamily : **SEGUENZIOIDEA** Verrill, 1884
Family : **CHILODONTIDAE** Wenz, 1938
Subfamily : **CALLIOTROPINAE** Hickman & McLean, 1990
Genus: ***Calliotropis*** Seguenza, 1903
Type species: *Trochus ottoi* Philippi, 1844 (by original designation) - Pliocene-Pleistocene, Italy.

Calliotropis pagodiformis (Schepman, 1908)
Figs 1-5

Solariellopsis pagodiformis Schepman, 1908: 60-61, pl. V, fig. 2. Type locality: Indonesia, 2°40'S-10°48.6'S, 128°37.5'E-123°23.1'E, 835-918 m.
Other reference :
Calliotropis pagodiformis - Vilvens, 2004: 28, figs 23-24.

Material examined. Indonesia (Tanimbar Islands). KARUBAR: stn CP54, 08°21'S, 131°43'E, 836-869 m, 1 dd. - Stn CP72, 08°36'S, 131°33'E, 699-676 m, 2 dd. - Stn CP87, 08°47'S, 130°49'E, 1017-1024 m, 2 dd. - Stn CP91, 08°44'S, 131°05'E, 884-891 m, 6 lv. - **Solomon Islands.** SALOMON 1: stn CP1750, 9°15.6'S, 159°54.6'E, 693-696 m, 25 dd. - Stn CP1751, 9°10.4'S, 159°53'E, 749-799 m, 12 dd, 1 dd sub, 3 dd juv. - Stn CP1806, 9°37.0'S, 160°49.7'E, 621-708 m, 1 dd, 1 dd sub. - Stn CP1808, 9°45.5'S, 160°52.5'E, 611-636 m, 1 dd, 1 dd juv. - Stn CP1858, 9°37.0'S, 160°41.7'E, 435-461 m, 4 dd & 5 dd sub.

Distribution. Indonesia, alive in 884-891 m, shells in 835-918 m (range computed using also data of Schepman, 1908); Solomon Islands, 461-749 m.

Remarks. This species was described from Indonesia and the records in Solomon Islands are new, giving a distribution that is provisionally disjoint.

Calliotropis conoeides n. sp.
Figs 6-9, Table 3

Type material. Holotype (31.3 x 25.2 mm) MNHN (9836). Paratypes: 3 MNHN (9837), 1 coll. C.Vilvens.

Type locality. Solomon Islands, SALOMON 1, stn CP1754, 9°00.1'S, 159°49.0'E, 1169-1203 m.

Material examined. Solomon Islands. SALOMON 1: stn CP1754, 9°00.1'S, 159°49.0'E, 1169-1203 m, 5 lv (holotype and 4 paratypes), 3 dd sub, 2 dd juv. - Stn CP1755, 8°58.2'S, 159°41.6'E, 1288-1313 m, 1 dd. - Stn CP1764, 8°36.6'S, 160°07.4'E, 1327-1598 m, 1 lv.

Distribution. Solomon Islands, alive in 1203-1327 m.

Diagnosis. A *Calliotropis* species with high spire, conical shape, whitish, with 2 spiral cords on spire whorls, the granules of the abapical cord the strongest; 2 peripheral granular cords and a very weak subsutural third granular cord on last whorl; 4 granular spiral cords on base; no umbilicus.

Description. *Shell* tall for the genus (height up to 31.5 mm, width up to 25.2 mm), higher than wide, rather thin, conical; spire high, height 1.2x to 1.3x width, 3.2x to 3.5x aperture height; without umbilicus.
Protoconch about 400 µm, of about 1 whorl, smooth, bulbous, with a weak, poorly visible, terminal varix.
Teleoconch up to 9.6 slightly convex whorls, bearing 3 spiral granular cords and prosocline threads; nodules from cords produced by intersections with axial threads on 5 first whorls.
Suture visible, not canaliculated.
First whorl convex, sculptured by about 20 weakly prosocline smooth ribs, interspace between ribs 2x broader than ribs; primary spiral cord P3 appearing almost immediately, P1 appearing about half a whorl later, weaker than P3, both bearing rounded nodules; P2 absent. On next three whorls, P1 and P3 stronger, P1 still weaker than P3; nodules of P3 sharp; interspace between axial ribs becoming 3x broader than ribs. On fifth whorl, P4 weakly emerging from suture, with nodules smaller and more numerous than nodules of P1 and P3; axial ribs becoming weaker. On sixth whorl, P1 becoming weaker, with blunt nodules; axial ribs obsolete. On seventh whorl, P1 becoming obsolete, only poorly visible; nodules of P3 large, prickly, isolated. On last whorl, P1 very weak, almost disappearing on some specimens; P3 the strongest; P4 fully visible, peripheral, with small sharp nodules four times more numerous than nodules of P3.
Aperture subelliptic, weakly flaring on the largest specimens; outer lip rather thin, indented by external spiral cords, producing an angle with inner lip, this angle obtuse on the largest specimens.
Columella slightly curved, slightly prosocline, without tooth.
Base moderately convex, with 4 granular spiral cords; innermost one stronger than others, with strong nodules, bordering umbilical area; distance between cords 3x broader than cords; numerous thin, weak, crowded axial lamellate threads between cords.
Colour of teleoconch hazel beige, without maculation; protoconch whitish.

	TW	H	W	HA	H/W	H/HA
holotype	9.6	31.3	25.2	9.7	1.24	3.23
paratype MNHN 1	8.5	24.1	18.6	6.9	1.30	3.49
paratype MNHN 2	7.8	24.2	20.2	7.4	1.20	3.27
paratype MNHN 3	7.8	18.8	15.9	5.7	1.18	3.30
paratype CV	8.8	25.1	20.4	7.2	1.23	3.49
specimen CP1764	9.0	31.5	25.1	9.7	1.25	3.25

Table 3. - *Calliotropis conoeides* : Shells measurements in mm for types and bigger specimen.

Discussion. *Calliotropis conoeides* n. sp. is close to *C. pagodiformis* (Schepman, 1908) (Figs 1-5) from Indonesia and Solomon Islands, but this species has a less slender shape, a much more channelled suture, the sharp nodules of P1 clearly visible and adapically oriented on the last whorls.
Regarding the spiral cords on whorls and base, the new species remembers also *C. minorusaitoi* Poppe, Tagaro & Dekker, 2006 from Philippines, but this species is similar in size for less numerous whorls, has a globose, not conical, shape and a wide umbilicus.
C. conoeides n. sp. is close to *C. philippei* Poppe, Tagaro & Dekker, 2006 from Philippines, but this species has an area between P1 and P2 with a convex shape, giving a cyrtoconoidal, not conical, shape to the shell, has a much weaker P1 cord, more numerous and more closely packed spiral cords on the base and seems (regarding the plate of the original description) to have an open wide umbilicus.

Etymology. Conical (Greek : κωνοειδης) - with reference to the general shape of the shell.

Calliotropis excelsior Vilvens, 2004
Figs 10-11

Calliotropis excelsior Vilvens, 2004: 26-30, figs 19-22. Type locality: Fiji, 17°42.6'S, 178°55.0'E, 959-963 m.

Material examined. New Caledonia. BIOCAL: stn CP26, 22°40'S, 166°27'E, 1618-1740 m, 2 dd. - Stn CP57, 23°44'S, 166°58'E, 1490-1620 m, 2 dd. - BIOGEOCAL: stn CP214, 22°43'S, 166°28'E, 1590-1665 m, 1 dd & 1 dd juv. - BATHUS 4: stn DW915, 18°51'S, 163°17'E, 575-580 m, 3 dd. - **Fiji.** MUSORSTOM 10: stn CP1354, 17°42.6'S, 178°55.0'E, 959-963 m, 1 dd sub.

Distribution. Fiji, 959-963 m and New Caledonia, 1000-1120 m (range computed using also data of Vilvens, 2004).

Remarks. This species was described from Fiji and New Caledonia. The new records only confirm its distribution.

Calliotropis helix n. sp.
Figs 12-15, Table 4

Type material. Holotype (19.6 x 19.4 mm) NTOU. Paratype MNHN (9838).

Type locality. Taiwan, South China Sea, TAIWAN 2000, stn CP30, 22°16.0'S, 120°15.8'E, 790 m.

Material examined. Taiwan. TAIWAN 2000: stn CP23, 22°11.9'S, 120°02.9'E, 876 m, 2 dd. - Stn CP30, 22°16.0'S, 120°15.8'E, 790 m, 2 lv (holotype and paratype). - Stn CP32, 22°01.7'S, 120°16.4'E, 904 m, 1 dd.

Distribution. Taiwan, South China Sea, alive at 790 m, shells in 790-904 m.

Diagnosis. A *Calliotropis* species with high spire, conical shape, brownish, with 2 spiral cords on spire whorls, the abapical prominent cord the strongest; 3 spiral cords on last whorl; base with 3 almost smooth spiral cords and an inner granular cord around the closed umbilicus.

Description. *Shell* rather tall for the genus (height up to 19.8 mm, width up to 19.4 mm), higher than wide, thin, conical; spire high, height 1.0x to 1.1x width, 2.7x to 3.0x aperture height; umbilicus closed.
Protoconch from 300 to 400 µm, of about 1 whorl, smooth, glassy, with only a weak, poorly visible, terminal line.

Figures 1-9. Scale bar = 5 mm.

1-5. *Calliotropis pagodiformis* (Schepman, 1908).
1-2. MNHN, Indonesia, 884-891 m [KARUBAR, stn CP91], 20.2 x 18.2 mm; **3-4.** MNHN, Solomon Is., 749-799 m [SALOMON 1, stn CP1751], 21.4 x17.6 mm; **5.** Syntype ZMA (3.08.065), Indonesia, 14.1 x 12.7 mm.
6-9. *C. conoeides* n. sp., Solomon Is., 1169-1203 m [SALOMON 1, stn CP1754].
6-7. Holotype MNHN (9836), 31.3 x 25.2 mm; **8-9.** Paratype MNHN (9837), 24.1 x 18.6 mm.

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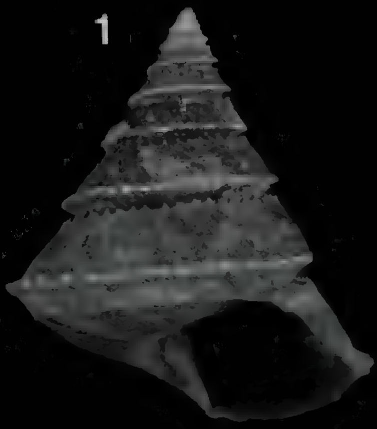

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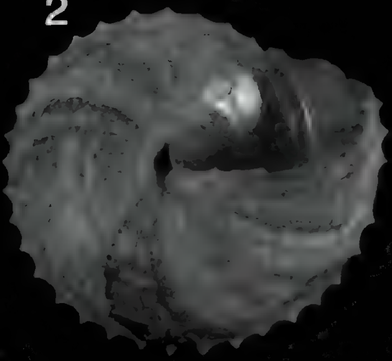

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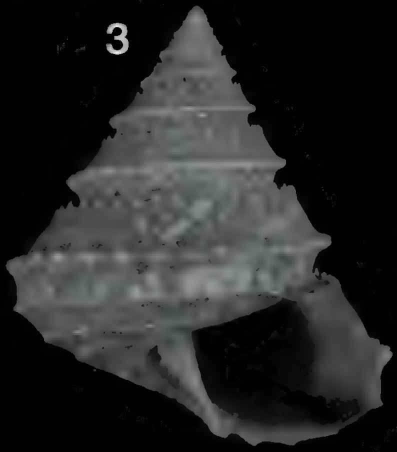

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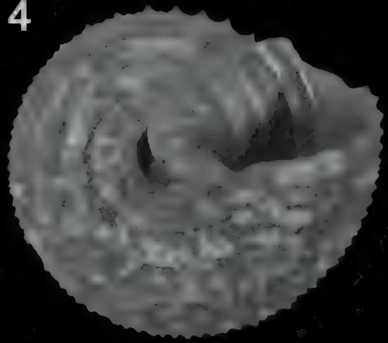

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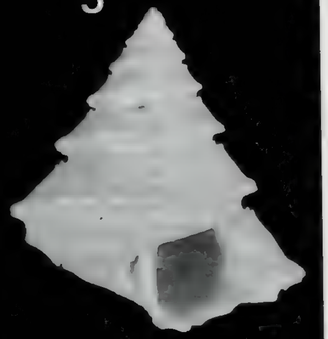

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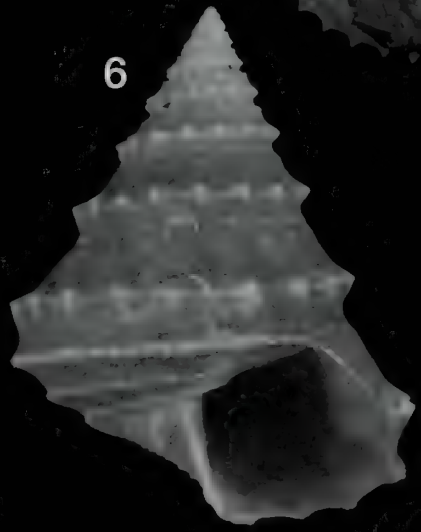

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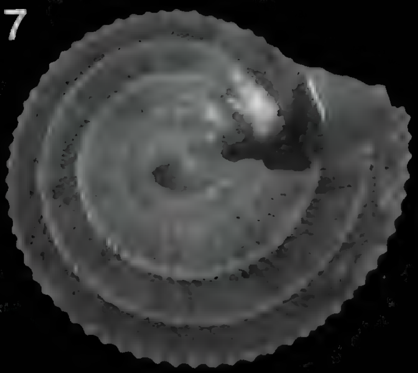

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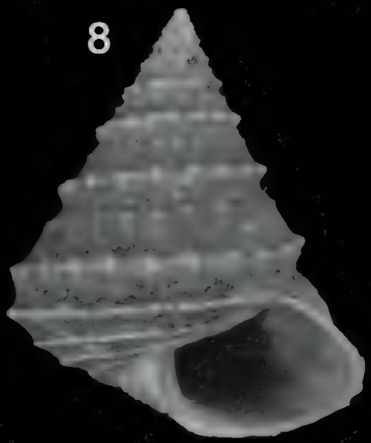

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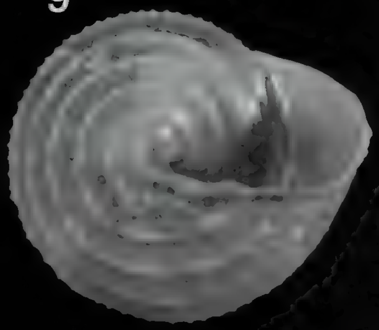

Teleoconch up to 8 slightly convex whorls, bearing 3 spiral granular cords and prosocline threads; nodules from cords produced by intersections with axial threads on 4 first whorls.

Suture visible, not canaliculated.

First whorl convex, sculptured by about 20 weakly prosocline smooth ribs, interspace between ribs 1.5x broader than ribs; primary spiral cords P1 and P3 appearing almost immediately, bearing rounded nodules; P1 weaker than P3; P2 absent. On second whorl, P3 still stronger than P1; nodules of cords becoming sharp; P4 emerging from suture at the end of the whorl, weaker than P1, with nodules smaller and more numerous than nodules of P1 and P3. On succeeding whorls, nodules of P3 sharp, separated and horizontally oriented; nodules of P1 weaker than those of P3, separated, oriented at an angle of 45°; axial ribs visible on second and third whorl, interspace between twice as broad as them; ribs obsolete at fourth whorl, disappearing on next whorls. On last whorl, nodules of P1 becoming blunt; nodules of P3 very strong and sharp; P4 fully visible, peripheral, with sharp nodules, smaller and more numerous than nodules of P1.

Aperture elliptic, slightly transverse; outer lip rather thin, indented by external spiral cords, without angle with inner lip.

Columella slightly curved, prosocline, without tooth.

Base convex, with 4 spiral cords; 3 outermost cords thin, smooth or only weakly subgranular; innermost one stronger than the others, granular with strong nodules, bordering umbilical area; distance between cords at least 4x broader than cords; obsolete axial lamellate threads between cords.

Umbilicus moderately wide, diameter measuring ca. 20% of shell width, funnel shaped, closed by columellar callus; crowded thin axial lamellae on parts of wall not covered by callus.

Colour of teleoconch terracotta, without maculation; protoconch off-white.

Operculum corneous, multispiral with a short growing edge.

	TW	H	W	HA	H/W	H/HA
holotype	7.8	19.6	19.4	6.9	1.01	2.84
paratype MNHN	8.0	19.8	18.1	6.5	1.09	3.05
specimen CP23 / 1	5.0	11.4	11.3	3.8	1.01	3.00
specimen CP23 / 2	6.0	10.8	10.1	3.7	1.07	2.92
specimen CP32	6.7	11.3	10.4	4.2	1.09	2.69

Table 4. - *Calliotropis helix* : Shells measurements in mm for types and specimens.

Discussion.

Calliotropis helix n. sp. is close to *C. pagodiformis* (Schepman, 1908) (Figs 1-5) from Indonesia and Solomon Islands, but this species has a more slender shape, a more channelled suture, the sharper nodules of P1 adapically oriented on all the whorls and narrower umbilicus partially open.

The new species may also be compared to *C. conoeides* n. sp. (Figs 6-9) from Solomon Islands, but this species is more slender (ratio H/W of 1.2 to 1.3 instead of 1.0 to 1.1) and has the nodules of P1 still clearly visible on the last whorls, the 3 outermost spiral of cords distinctly granular and no umbilicus.

Etymology. Screw (Greek : ελιξ), used as a noun in apposition - with reference to the shape of the shell.

Calliotropis cynee n. sp.

Figs 16-19, Table 5

Type material. Holotype (16.2 x 13.1 mm) MNHN (9839). Paratypes: 6 MNHN (9840), 2 MZB (Gst. 13.638), 1 coll. C.Vilvens.

Type locality. Indonesia, Tanimbar Islands, KARUBAR, stn CP89, 08°39'S, 131°08'E, 1084-1058 m.

Material examined. Indonesia. KARUBAR: stn CP52, 08°03'S, 131°48'E, 1244-1266 m, 2 dd. - Stn CP89, 08°39'S, 131°08'E, 1084-1058 m, 10 dd (holotype and paratypes), 8 dd sub, 2 dd juv - Stn CP91, 08°44'S, 131°05'E, 884-891 m, 4 dd.

Distribution. Indonesia, Tanimbar Islands, 891-1244 m.

Diagnosis. A *Calliotropis* species with high spire, conical shape, silvery, with 2 spiral cords on spire whorls, the abapical prominent cord the strongest, the adapical one vanishing on last whorls; a third thin spiral cord peripheral on last whorl; base with 2 nearly smooth spiral cords and an inner granular cord around the umbilicus; no spiral cord within the umbilicus.

Description. *Shell* of medium size for the genus (height up to 16.2 mm, width up to 13.4 mm), higher than wide, thin, conical; spire high, height 1.1x to 1.2x width, 2.5x to 3.0x aperture height; umbilicus deep and rather large.

Protoconch from 250 to 300 µm, of 1 whorl, smooth, glassy, with only a weak, poorly visible, terminal line.

Teleoconch up to 7.8 slightly convex whorls, bearing 3 spiral granular cords and prosocline threads; nodules from cords produced by intersections with axial threads on 3 first whorls.

Suture visible, not canaliculated.

First whorl convex, sculptured by about 20 weakly prosocline smooth ribs, interspace between ribs 1.5x broader than ribs; primary spiral cords P1 and P3 appearing almost immediately, bearing rounded nodules; P1 slightly weaker than P3; P2 absent. On second whorl, P3 still stronger than P1; nodules of both cords sharp. On succeeding whorls, nodules of P3 sharp, separated and horizontally oriented; nodules of P1 also sharp but weaker than those of P3, separated, oriented at an angle of 45°; axial ribs visible on second and third whorl, interspace three times as broad as them; ribs becoming obsolete at fourth whorl, disappearing on next whorls. On sixth (or fifth for some specimens) whorl, nodules of P1 blunt; nodules of P3 still strong and sharp; nodules of P1 becoming obsolete on succeeding whorls. On last whorl, P4 visible, peripheral, thin, nearly smooth; P1 obsolete, even absent on several specimens.

Aperture subcircular; outer lip thin, indented by external spiral cords, without angle with inner lip.

Columella curved, slightly prosocline, without tooth or with a weak blunt tooth at mid-height.

Base moderately convex, with 3 spiral cords; 2 outermost cords thin, smooth or only weakly subgranular; innermost one stronger than others, granular with sharp nodules, bordering umbilicus; distance between cords four times broader than cords; axial lamellate threads between the two innermost cords.

Umbilicus wide, diameter measuring ca. 30% of shell width, funnel shaped, with thin axial lamellae, without spiral cord.

Colour of teleoconch silver-grey, without maculation; protoconch off-white.

	TW	H	W	HA	H/W	H/HA
holotype	7.8	16.2	13.1	5.4	1.24	3.00
paratype MNHN 1	7.7	16.0	13.0	5.7	1.23	2.81
paratype MNHN 2	7.8	15.4	13.4	5.4	1.15	2.85
paratype MNHN 3	7.4	14.1	11.8	4.8	1.19	2.94
paratype MNHN 4	7.4	13.7	11.8	4.6	1.16	2.98
paratype MNHN 5	7.2	12.6	11.1	4.9	1.14	2.57
paratype MNHN 6	6.9	13.1	11.4	5.0	1.15	2.62
paratype MZB 1	7.0	14.0	11.6	5.2	1.21	2.69
paratype MZB 2	7.8	14.0	11.4	5.5	1.23	2.55
paratype CV	7.6	14.6	13.0	5.3	1.12	2.75

Table 5. - *Calliotropis cynee* : Shells measurements in mm for types.

Discussion. *Calliotropis cynee* n. sp. is rather close to *C. conoeides* n. sp. (Figs 6-9) from Solomon Islands, but this species has a more slender shape, a granular P4 emerging much earlier (at the fourth whorl), four spiral cords on the base and no umbilicus.

The new species also weakly resembles to the cosmopolite *C. infundibulum* (Watson, 1879) (Figs 84-85), but this species shows a P1 cord strong and granular, still present on last whorl, and has 4 ou 5 spiral cords on the base.

C. cynee n. sp. is also superficially similar to *C. diomediae* (Verril, 1880) from north-western Atlantic, but this slightly larger species has a strong, granular spiral cord P1, far from the suture on last whorl, and 4 spiral cords on the base.

The new species remembers also *C. minorusaitoi* Poppe, Tagaro & Dekker, 2006 from Philippines, but this species is larger for a smaller number of whorls, has a globose, not conical, shape, a narrower umbilicus and 4 spiral cords on the base.

Etymology. Leather helmet (Greek : κυνεης), used as a noun in apposition - with reference to the look of the shell.

Calliotropis infundibulum (Watson, 1879)

Figs 84-85

Trochus infundibulum Watson, 1879: 707-708. Type locality: Prince Edward Island (Indian-Atlantic Ridge area), 46°46'S, 45°31'E, 2514 m.

Other references :

Solariella infundibulum - Dall, 1889: 380-381.
Solariella infundibulum - Dall, 1890: 349-352.
Solariella infundibulum - Abbott, 1974: 41, fig. 287.
Solariella infundibulum - Cernohorsky, 1977: 105, fig. 1.

Calliotropis infundibulum - Marshall, 1979: 531, figs. 4E-G, 9C-I
Calliotropis infundibulum - Kaicher, 1990: 5690.
Calliotropis infundibulum - Sasaki, 2000: 59, pl. 29, fig. 25.
Calliotropis infundibulum - Vilvens, 2004: figs. 27-28.

Material examined. New Caledonia. BIOCAL: stn CP23, 22°46'S, 166°20'E, 2040 m, 1 dd. - Stn CP27, 23°06'S, 166°26'E, 1850-1900 m, 1 dd. - **Loyalty Basin.** BIOGEOCAL: stn CP250, 21°25'S, 166°28'E, 2350 m, 1 dd. - Stn CP329, 21°09'S, 166°40'E, 2310-2315 m, 1 dd.

Distribution. Western Atlantic (from northern America to Brazil), 230-3259 m (Clarke, 1962), Indian-Atlantic Ridge, 1965-2514 m (Watson, 1879); South Africa, 2750 m (Martens, 1903); Japan, 2000-2150 m (Higo et al., 1999); south-western Pacific, 2040-2315 m; New Zealand, 2080-2515 m (Marshall, 1979).

Remarks. This is an extension of this widespread species, known from western Atlantic to western Indo-Pacific.

Calliotropis hataii Rehder & Ladd, 1973

Figs 86-87

Calliotropis hataii Rehder & Ladd, 1973: 43-44, figs. 16-18. Type locality: central Pacific (Hess Guyot), 17°53.2'N, 174°28.28'W, 1719-1763 m.
Other references :
Calliotropis hataii - Kaicher, 1987: 5064.
Calliotropis hataii - Vilvens, 2006: 60, figs. 16-17.

Material examined. New Caledonia. BIOCAL: stn CP17, 20°35'S, 167°25'E, 3680 m, 1 dd. - Stn CP26, 22°40'S, 166°27'E, 1618-1740 m, 3 dd. - Stn CP57, 23°44'S, 166°58'E, 1490-1620 m, 5 dd. - BATHUS 1: stn 661, 21°05'S 165°50'E, 960-1100 m, 2 dd.
Loyalty Basin. BIOGEOCAL: stn CP214, 22°43'S, 166°28'E, 1590-1665 m, 1 dd.
Fiji. MUSORSTOM 10: stn CP1354, 17°42.6'S, 178°55.0'E, 959-963 m, 5 dd, 1 dd sub. - Stn CP1361, 18°00.0'S, 178°53.7'E, 1058-1091 m, 2 dd.
South-western Pacific. MUSORSTOM 7: stn CP620, 12°34'S, 178°11'W, 1280 m, 2 dd. - Stn CP621, 12°35'S, 178°11'W, 1280-1300 m, 4 dd. - Stn CP622, 12°34'S, 178°11'W, 1280-1300 m, 1 dd. - Stn CP623, 12°34'S, 178°15'W, 1280-1300 m, 4 dd.

Distribution. Central Pacific, 1617-1719 m (Rehder & Ladd, 1973); south-western Pacific, 1058-1280; south-western Indian Ocean, 3716 m (Vilvens, 2006).

Remarks. This species was described from Central Pacific Ocean and recently recorded in south-western Indian Ocean (Vilvens, 2006), but seems to be much more widespread. In some examined specimens, P1 is dividing in two cords, but except this feature, all specimens share the same ontogeny of cords as stated in the original description.

Calliotropis chalkeie n. sp.

Figs 24-31, Table 6

Type material. Holotype (6.5 x 4.9 mm) MNHN (9841). Paratypes: 8 MNHN (9842), 2 NMNZ (M.273550), 1 coll. C.Vilvens.

Type locality. Loyalty Basin, BIOGEOCAL, stn DW313, 20°59'S, 166°59'E, 1600-1640 m.

Material examined. Loyalty Basin. BIOGEOCAL: stn KG201, 22°40'S, 166°33'E, 595 m, 1 dd sub. - Stn KG219, 22°39'S, 166°34'E, 570 m, 2 dd, 1 dd juv. - Stn KG222, 22°45'S, 166°25'E, 1675 m, 1 dd. - Stn KG227, 21°33'S, 166°24'E, 500 m, 1 dd, 1 dd sub, 7 dd juv. - Stn KG234, 21°29'S, 166°25'E, 570 m, 1 dd. - Stn CP238, 21°28'S, 166°23'E, 1260-1300 m, 5 dd. - Stn CP260, 21°00'S, 166°58'E, 1820-1980 m, 3 dd, 1 dd sub, 2 dd juv. - Stn DW313, 20°59'S, 166°59'E, 1600-1640 m, 7 dd (holotype and paratypes), 13 dd sub (with 5 paratypes), 5 dd juv.
New Caledonia. BIOCAL: stn KG06, 20°35'S, 166°53'E, 735 m, 8 dd, 6 dd juv. - Stn CP26, 22°40'S, 166°27'E, 1618-1740 m, 1 dd. - Stn DW51, 23°05'S, 167°45'E, 680-700 m, 3 dd. - Stn CP57, 23°44'S, 166°58'E, 1490-1620 m, 4 dd juv. - Stn CP62, 24°19'S, 167°49'E, 1395-1410 m, 1 dd. - Stn DW79, 20°40'S, 166°52'E, 1320-1380 m, 4 dd. - CALSUB: PL13, 21°26'S, 166°23'E, 1600 m, 2 dd juv. - BATHUS 1: stn DW696, 20°34'S, 164°57'E, 497-520 m, 2 dd, 3 dd juv. - BATHUS 3: stn DW790, 23°49'S, 169°48'E, 685-715 m, 3 dd, 1 dd sub.

Figures 10-19. Scale bar = 5 mm.

10-11. *Calliotropis excelsior* Vilvens, 2004, holotype MNHN, Fiji, 959-963 m [MUSORSTOM 10, stn. CP1354], 24.4 x 20.9 mm.
12-15. *C. helix* n. sp., Taiwan, South China Sea, 790 m [TAIWAN 2000, stn CP30].
12-13. Holotype NTOU, 19.6 x 19.4 mm; **14-15.** Paratype MNHN (9838), 19.8 x 18.1 mm.
16-19. *C. cynee* n. sp., Indonesia, Tanimbar Islands, 1084-1058 m [KARUBAR, stn CP89].
16-17. Holotype MNHN (9839), 16.2 x 13.1 mm; **18.** Paratype MNHN (9840), columella with basal tooth, 15.5 x 13.3 mm; **19.** Columella with basal tooth of paratype MNHN (9840).

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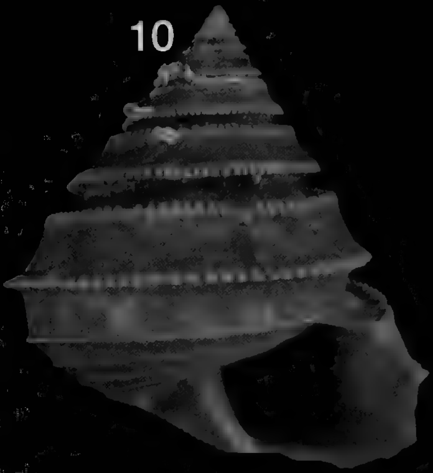

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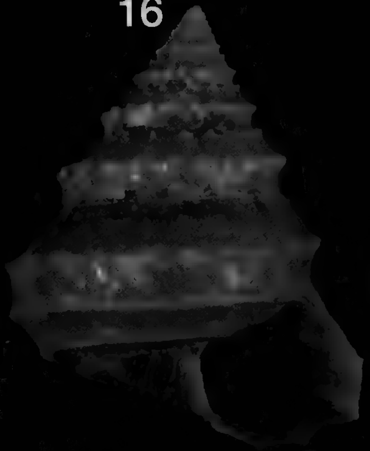

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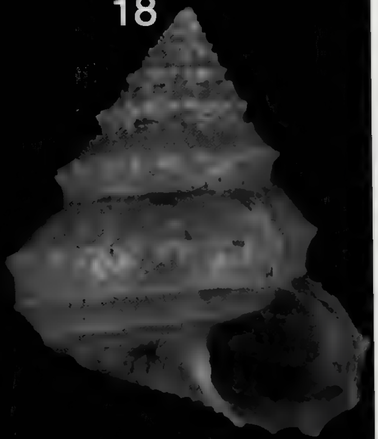

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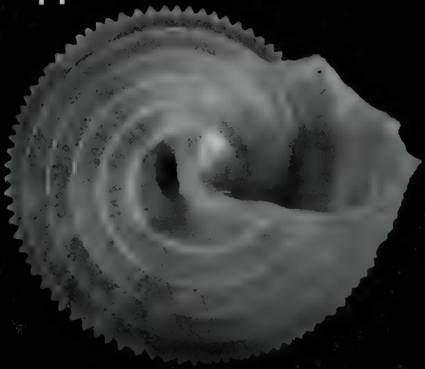

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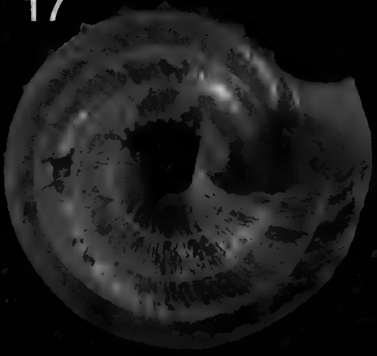

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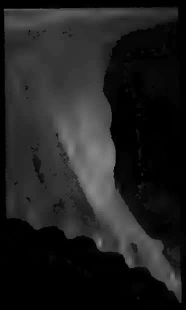

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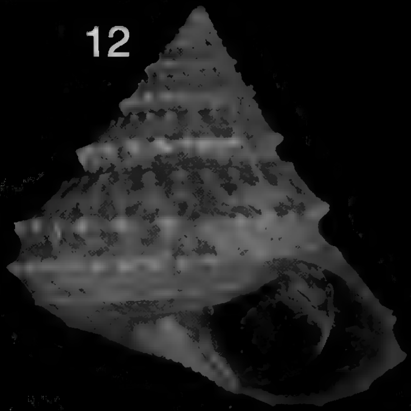

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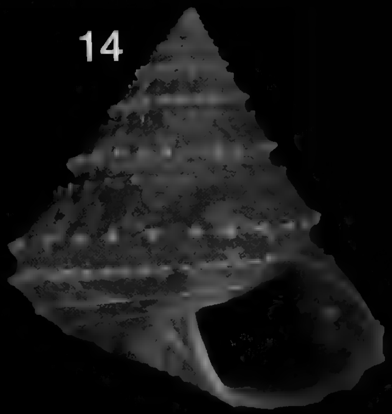

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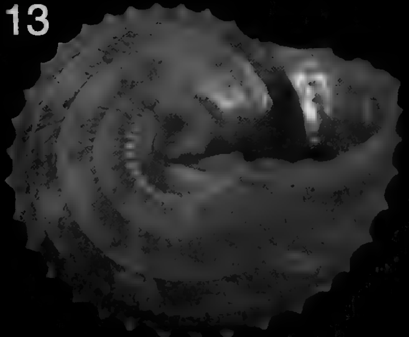

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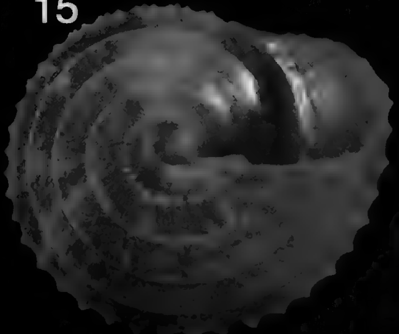

Solomon Islands. SALOMON 1: stn CP1751, 9°10.4'S, 159°53'E, 749-799 m, 1 dd. - Stn CP1754, 9°00.1'S, 159°49.0'E, 1169-1203 m, 1 dd. - Stn DW1781, 8°31.2'S, 160°37.7'E, 1036-1138 m, 1 dd, 1 dd juv. - Stn CP1806, 9°37.0'S, 160°49.7'E, 621-708 m, 2 dd, 1 dd juv. - Stn CP1808, 9°45.5'S, 160°52.5'E, 611-636 m, 8 dd, 5 dd sub.
South-western Pacific, Wallis and Futuna Islands. MUSORSTOM 7: stn DW507, 14°20'S, 178°07'W, 419-425 m, 1 dd. - Stn DW519, 14°13'S, 178°09'W, 500 m, 1 dd. - Stn DE568, 11°46'S, 178°27'W, 1011 m, 1 dd. - Stn DW601, 13°19'S, 176°17'W, 350 m, 3 dd sub. - Stn DW604, 13°21'S, 176°08'W, 415-420 m, 1 dd, 1 dd sub. - Stn DW608, 13°22'S, 176°08'W, 440-458 m, 7 dd, 2 dd juv.
Vanuatu. MUSORSTOM 8: stn CP1110, 14°49'S, 167°15'E, 1360 m, 4 dd, 1 dd juv.
Fiji. BORDAU 1: stn DW1485, 19°03'S, 178°30'W, 700-707 m, 6 dd, 2 dd sub, 2 dd juv.

Distribution. South-western Pacific (from Solomon Islands to New Caledonia and Fiji), 707-1360 m.

Diagnosis. A *Calliotropis* species with high spire, conical shape, silvery, with 3 spiny primary spiral cords on spire whorls and up to 7 spiral spiny cords on last whorl; base with about 7 spiral spiny cords; umbilicus with 2 spiny spiral cords inside.

Description. *Shell* of small size for the genus (height up to 6.5 mm, width up to 4.9 mm), higher than wide, thin, conical; spire high, height 1.1x to 1.3x width, 2.7x to 4.3x aperture height; umbilicus deep and rather large.
Protoconch from 250 to 300 µm, of 1 whorl, smooth, bulbous, with a rather thick, slightly curved terminal varix.
Teleoconch up to 6.2 convex whorls, bearing up to 7 spiral granular cords and prosocline ribs; nodules from cords produced by intersections with axial ribs.
Suture visible, impressed but not canaliculated.
First whorl convex, sculptured by about 15 weakly prosocline smooth thick ribs, interspace between ribs 2x broader than ribs. Primary spiral cords P1 appearing at end of first whorl or at beginning of second whorl; P2 appearing a quarter of whorl later; both cords formed by weak rounded nodules. On third whorl, P2 stronger than P1, with nodules becoming sharp and clearly separated; P3 appearing at mid whorl, quickly as strong as P2. On fourth whorl, P2 and P3 strongly spiny; P1 slightly weaker than the other cords; spines of P1 and P2 oriented at an angle of about 45°, those of P3 horizontally oriented. On fifth whorl, spines of cords becoming scaly; P1 dividing into two cords, the most adapical weaker; axial ribs still strong, becoming more prosocline; S1 and S2 appearing at end of whorl or on the sixth whorl. On last whorls, P4 emerging from suture, weaker than P3, spiny; S3 appearing near begin of sixth whorl, becoming spiny on some big specimens.
Aperture circular; outer lip thin, without angle with inner lip.
Columella curved, vertical, without tooth.
Base moderately convex, with 4 main spiny spiral cords and a weaker cord between them; outermost the thickest, innermost the thinnest with sharp thin spines, bordering umbilicus; distance between cords similar in size to cords; axial ribs clearly visible, connecting nodules of spiral cords.
Umbilicus rather wide, diameter measuring ca. 25% of shell width, deep, funnel shaped, with thin ribs and 2 spiny spiral cords, sometimes with an additional thin spiral cord near border.
Colour of teleoconch light pinkish brown; protoconch off-white.

	TW	H	W	HA	H/W	H/HA
holotype	6.2	6.5	4.9	1.6	1.33	4.06
paratype MNHN 1	6.0	5.4	4.4	1.2	1.23	4.50
paratype MNHN 3	5.5	5.0	3.9	1.6	1.28	3.13
paratype MNHN 4	5.9	6.0	4.7	2.1	1.28	2.86
paratype MNHN 5	5.5	4.7	3.7	1.3	1.27	3.62
paratype NMNZ 1	6.0	5.5	4.1	1.3	1.34	4.23
paratype CV	5.3	4.6	4.1	1.7	1.12	2.71

Table 6. - *Calliotropis chalkeie* : Shells measurements in mm for largest types.

Discussion. This species is rather variable regarding the shape of the spines of the spiral cords.
Calliotropis chalkeie n. sp. is very close to *C. spinosa* Poppe, Tagaro & Dekker, 2006 from Philippines, but this species is slightly less elevated, is smaller for a similar number of whorls and its last whorl is higher than half of the shell height (instead of mesuring about 2/5 of this height).
C. chalkeie n. sp. is rather close to *C. lamellifera* Jansen, 1994 (Figs 20-23) from eastern Australia, but

this species has a more acute shape, thicker, not scaly, less numerous spines on the spiral cords on the whorls, thinner, nearly smooth outermost spiral cords on base without strong axial ribs between them, and nodular, not spiny, spiral cords in the umbilicus.
The new species also superficially similar to *C. hondoensis* (Dall, 1919) from Japan, but this much taller species has granular, not spiny, thinner cords on whorl, and nearly smooth outermost spiral cords on base without strong axial ribs between them; its umbilicus is wider than the one of the new species.
C. chalkeie n. sp. also weakly resembles to *C. solariellaformis* Vilvens, 2006 (Figs 32-33) from Réunion Island, but this species is different in having a slightly less elevated spire, S1 appearing much earlier, less numerous and not spiny granules on spiral cords and a proportionally larger aperture.
The new species may also be compared to *C. ericius* Vilvens, 2006 (Figs 34-35) from Mayotte and Réunion Islands, but this species has more convex whorls, a less elevated spire, no S2, less numerous and only prickly, not scaly, spiny granules on spiral cords.

Remarks. All the specimens of Solomon Islands have a S1 cord always appearing first, at end of fourth whorl and S2 appearing second at end of fifth whorl. However, this inversion of order of apparition of S1 and S2 compared to the most specimens of New Caledonia may also be found in some specimens of Wallis Is., Futuna Is., Loyalty Basin and Fiji. So this feature can't be used to distinguish a geographical subspecies.

Etymology. Thistle (Greek : χαλκειη), used as a noun in apposition - with reference to the spiny nodules of the spiral cords.

Calliotropis acherontis Marshall, 1979
Figs 36-41

Calliotropis acherontis Marshall, 1979: 529-530, figs. 3L-O 9A-B, tab 5. Type locality: Kermadec Islands (Raoul Is.), 29°16.5'S, 177°49.5'W, 512-549 m.
Other references :
Calliotropis acherontis - Jansen, 1994: 48-49, pl. 1, figs. e-f.
Calliotropis acherontis - Vilvens, 2006: 66, figs. 44-46.

Material examined. New Caledonia. LAGON: stn 40, 250-350 m, 22°10'S 166°24'E, 1 dd. - Stn 22, 22°59'S, 167°17'E, 540-545 m, 1 dd. - BIOCAL: stn DW08, 20°34'S, 166°54'E, 435 m, 3 dd. - Stn DW46, 22°53'S, 167°17'E, 570-610 m, 100 dd. - Stn DW48, 23°00'S, 167°29'E, 775 m, 1 dd. - Stn DW66, 24°55'S, 168°22'E, 505-515 m, 1 dd. - MUSORSTOM 4: stn DW221, 22°59'S, 167°37'E, 535-560 m, 15 lv. - CALSUB: PL15, 20°37'S, 166°56'E, 538 m, 1dd sub & 2 dd juv. - SMIB 8: DW193-196, 22°52'S-23°S, 167°20'-168°22'E, 491-558 m, 1 dd. - BATHUS 1: stn CP651, 21°42'S, 166°40'E, 1080-1180 m, 12 dd, 6 dd juv. - BATHUS 2: stn DW719, 22°48'S, 167°16'E, 444-445 m, 1 dd. - Stn DW720, 22°52'S 167°16'E, 530-541 m, 30 dd. - Stn CP761, 22°19'S, 166°11'E, 490-500 m, 1 dd & 5 dd juv. - BATHUS 3: stn DW824, 23°19'S, 168°00'E, 601-608 m, 2 dd & 2 dd juv. - Stn DW838, 23°01'S, 166°56'E, 400-402 m, 1 dd juv. - HALIPRO 1: stn C858, 21°42'S, 166°41'E, 1000-1120 m, 4 dd. - BATHUS 4: stn DW914, 18°49'S, 163°15'E, 600-616 m, 40 dd. - Stn DW918, 18°49'S, 163°16'E, 613-647 m, 1 dd. - HALIPRO 2: stn BT102, 24°31'S, 161°52'E, 1060-1130 m, 4 dd & 1 dd juv.
Loyalty Basin. BIOGEOCAL: stn KG219, 22°39'S, 166°34'E, 570 m, 20 dd. - Stn KG228, 21°31'S, 166°24'E, 960 m, 1 dd, 6 dd juv. - Stn CP232, 21°34'S, 166°27'E, 760-790 m, 25 dd juv. - Stn KG261, 21°02'S, 167°02'E, 1508 m, 1 dd, 1 dd juv. - Stn DW292, 20°28'S, 166°48'E, 465-470 m, 1 dd.
Wallis and Futuna Islands. MUSORSTOM 7: stn DW507, 14°20'S, 178°07'W, 419-425 m, 1 dd. - Stn DW523, 13°12'S, 176°16'W, 455-515 m, 4 dd, 1 dd juv. - Stn DW560, 11°47'S, 178°20'W, 697-702 m, 1 dd. - Stn DW585, 13°10'S, 176°13'W, 415-475 m, 1 dd. - Stn DW601, 13°19'S, 176°17'W, 350 m, 100 dd. - Stn DW604, 13°21'S, 176°08'W, 415-420 m, 40 dd. - Stn DW608, 440-458 m, 13°22'S 176°08'W, 40 dd.
Fiji. MUSORSTOM 10: stn DW1353, 17°30.9'S, 178°53.3'E, 879-897 m, 2 dd. - Stn CP1360, 17°59.6'S, 178°48.2'E, 402-444 m, 4 dd.
Vanuatu. MUSORSTOM 8: stn DW987, 19°23'S, 169°35'E, 1040-1050 m, 4 dd.
Solomon Islands. SALOMON 1: stn DW1785, 9°20.8'S, 160°27.3'E, 400 m, 1 dd. - Stn CP1806, 9°37.0'S, 160°49.7'E, 621-708 m, 6 dd. - Stn CP1808, 9°45.5'S, 160°52.5'E, 611-636 m, 20 dd. - Stn CP1837, 10°12.8'S, 161°28.6'E, 381-383 m, 3 dd. - Stn CP1858, 9°37.0'S, 160°41.7'E, 435-461 m, 1 dd, 3 dd juv.

Distribution. South-western Pacific (from eastern Australia to Solomon Islands, New Caledonia and Fiji), alive in 535-560, shells in 621-1040 m; south-western Indian Ocean, 500-770 m (Vilvens, 2006).

Remarks. This species was originally described from Kermadec Islands, but appears now to have a very wider distribution area .

Calliotropis crystalophora Marshall, 1979
Figs 42-45

Calliotropis crystalophorus Marshall, 1979: 530, figs. 4A-D, tab. 6. Type locality: Kermadec Islands (Raoul Is.), 29°16.5'S, 177°14.5'W, 512-549 m.
Other reference :
Calliotropis crystalophora - Vilvens, 2006: 68, figs. 47-48.

Material examined. New Caledonia. BIOCAL: stn KG06, 20°35'S, 166°53'E, 735 m, 3 dd. - Stn DW56, 23°35'S, 167°12'E, 1490-1620 m, 1 dd. - BATHUS 3: stn DW790, 23°49'S, 169°48'E, 685-715 m, 2 dd sub, 1 dd juv. - Stn DW 809, 23°39'S, 167°59'E, 650-730 m, 1 dd.
Loyalty ridge. MUSORSTOM 6: stn DW468, 21°06'S, 167°33'E, 600 m, 5 dd, 2 dd juv.
South-western Pacific, Wallis and Futuna Islands. MUSORSTOM 7: stn DW594, 12°31'S, 174°20'W, 495-505 m, 1 dd. - Stn DW604, 13°21'S, 176°08'W, 415-420 m, 1 dd.
Fiji. BORDAU 1: stn DW1485, 19°03'S, 178°30'W, 700-707 m, 2 dd.
Vanuatu. MUSORSTOM 8: stn CP1036, 18°01'S, 168°48'E, 920-950 m, 1 dd.
Tonga. BORDAU 2: stn DW1588, 18°40'S, 173°52'W, 630-710 m, 1 dd juv.

Distribution. South-western Pacific (from New Caledonia to Tonga), 495-920 m.

Remarks. The main distinguishing features of *C. crystalophora* Marshall, 1979 are a small size (height about 4.5 mm), a relatively high spire, up to 7.5 whorls, 2 sharp spiral cords on whorls (P1 near the suture, separated from it by a nearly horizontal subsutural ramp, and P3 stronger, median), P4 peripheral on last whorl, widely spaced axial ribs on the whole surface, microsculpture of irregular crystals, 4 granular spiral cords on the base, a shallow, rather narrow umbilicus.
There is no mention in the original description of spiral cords within the umbilicus, but close examination of the NMNZ holotype showed presence of at least one thin spiral cord. I don't know any other reference to this species and there is no indication about the variability of the shell. Specimens of MUSORSTOM 6: stn DW468, BATHUS 3: stn DW 809 and BIOCAL: stn DW56 match the characteristics of *C. crystalophora*, except that a secondary spiral cord S2 is present on last whorl and the umbilicus has a granular spiral cord within. Moreover, specimens of BIOCAL: stn DW56 have tertiary cords between P1 and P2. There is no obvious relation with depth .

Calliotropis ptykte n. sp.

Figs 46-49, Table 7

Type material. Holotype (4.1 x 3.2 mm) MNHN (9843). Paratypes: 5 MNHN (9844), 1 coll. C.Vilvens.

Type locality. Tonga, south of Nomuka group, BORDAU 2, stn DW1549, 20°38'S, 175°00'W, 500 m.

Material examined. Tonga. BORDAU 2: stn DW1549, 20°38'S, 175°00'W, 500 m, 7 dd (holotype and paratypes). - Stn DW1615, 23°03'S, 175°53'W, 482-504 m, 1 dd juv.

Distribution. Tonga, 500 m.

Diagnosis. A small *Calliotropis* species with high spire, conical shape, white, with thin crowded axial ribs on the whole surface, 2 granular spiral cords on spire whorls, a keel at the abapical cord; 5 spiral cords on last whorl; base with 4 granular spiral cords; umbilicus with a thin spiral cord inside.

Description. *Shell* of small size for the genus (height up to 4.1 mm, width up to 3.2 mm), higher than wide, thin, conical; spire high, height 1.2x to 1.4x width, 3.9x to 4.9x aperture height; umbilicus rather narrow.
Protoconch from 180 to 200 µm, of 1 whorl, glassy, with a very weak, slightly curved terminal varix.
Teleoconch up to 6 weakly convex whorls, bearing up to 7 spiral granular cords and prosocline ribs; nodules from cords produced by intersections with axial ribs. Suture weakly canaliculated.

Figures 20-35. Scale bar = 5 mm.

20-23. *Calliotropis lamellifera* Jansen, 1994.
 20-21. Holotype AMS (C. 169587), New South Wales, off Sidney, 1106-1143 m, 4.8 x 4.3 mm - Photographs taken by M.Allen, AMS; **22-23.** MNHN, New Caledonia, 908 m [BIOCAL, stn CP844], 3.3 x 2.8 m.
24-31. *C. chalkeie* n. sp.
 24-27. Loyalty Basin, 1600-1640 m [BIOGEOCAL, stn DW313]. **24-25**. Holotype MNHN (9841), 6.5 x 4.9 mm; **26-27**. Paratype MNHN (9842), 5.4 x 4.4 mm; **28-29**. MNHN, New Caledonia, 680-700 m [BIOCAL, stn DW51], 4.8 x 4.4 mm; **30-31.** MNHN, Solomon Islands, 611-636 m [SALOMON 1: stn CP1808], 4.4 x 3.7 m.
32-33. *C. solariellaformis* Vilvens, 2006, holotype MNHN (5816), Réunion Island, 1150-1180 m [MD32/REUNION, stn DC64], 6.0 x 4.9 mm.
34-35. *C. ericius* Vilvens, 2006, holotype MNHN (5808), Mayotte, 1300-1480 m [BENTHEDI, stn 40], 4.7 x 4.1 mm.

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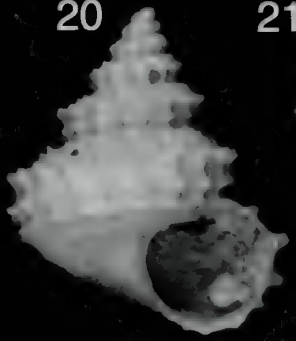

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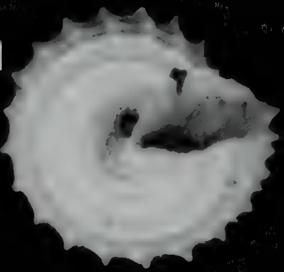

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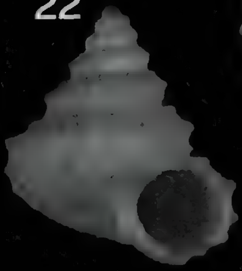

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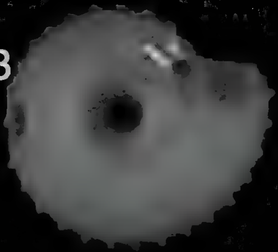

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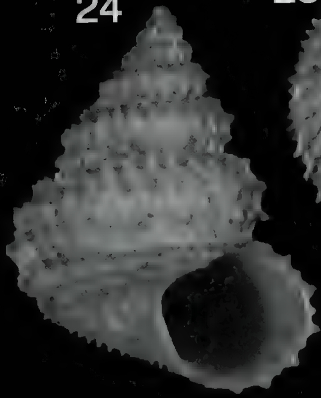

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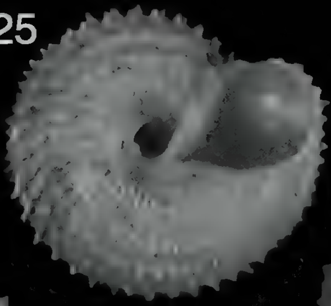

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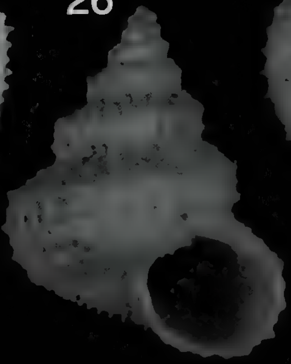

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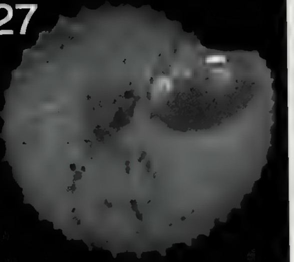

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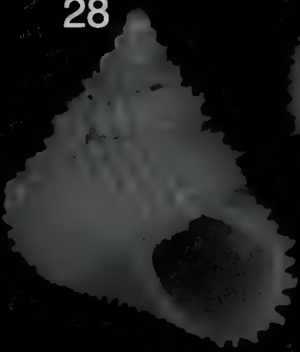

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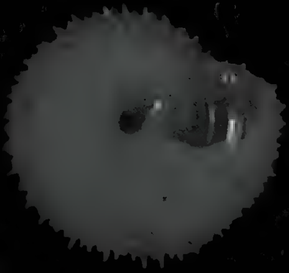

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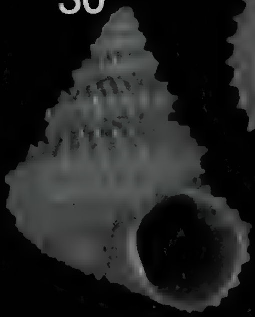

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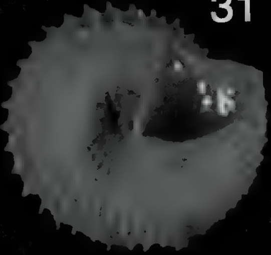

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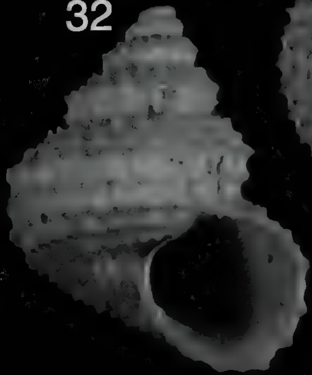

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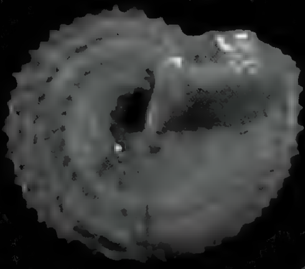

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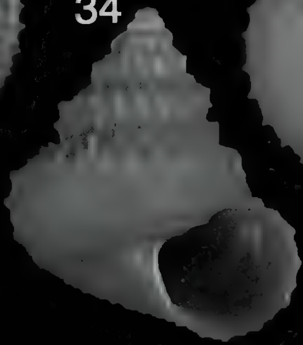

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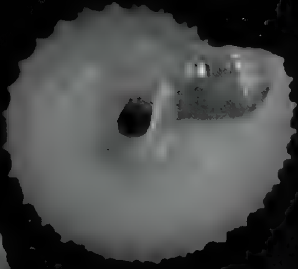


First whorl convex, sculptured by about 15 prosocline smooth ribs, interspace between ribs 1.5x broader than ribs. Primary spiral cords P1 appearing at end of first whorl, P3 at beginning of second whorl, both granular; P2 absent. On second whorl, P3 slightly stronger than P1; P1 producing a weak shoulder and P3 a weak keel. On third whorl, beads of P1 slightly sharp, blunt, adapically oriented; axial ribs thicker, more prosocline, distance between them as broad as ribs. S1 appearing on fifth whorl, weak; S3 appearing at end of fifth whorl or at begin of sixth whorl, weaker than P3 but quickly stronger than S1; tertiary cords T1 and T3 may appear between P1 and S1, and S1 and P3; axial ribs more prosocline in area above P3 than under this cord. On last whorl, P4 emerging from suture, almost as strong as P3.

Aperture circular, indented by external spiral cords; outer lip thin, without angle with inner lip.

Columella more or less straight, slightly oblique, without tooth.

Base moderately convex, with 4 thick granular spiral cords; distance between cords similar in size to cords; strong axial ribs between cords, connecting beads of spiral cords.

Umbilicus rather narrow, diameter measuring ca. 10% of shell width, rather deep, funnel shaped, with thin ribs and 1 weak spiral cord inside, near border.

Colour of teleoconch ivory white; protoconch translucid white.

	TW	H	W	HA	H/W	H/HA
holotype	6.0	4.1	3.2	0.9	1.28	4.56
paratype MNHN 1	6.0	3.6	2.8	0.9	1.29	4.00
paratype MNHN 2	5.6	3.9	3.2	1.0	1.22	3.90
paratype MNHN 3	5.6	3.9	3.0	0.8	1.30	4.88
paratype MNHN 4	5.0	3.9	2.9	0.9	1.34	4.33
paratype MNHN 5	5.8	4.0	2.9	0.9	1.38	4.44
paratype CV	6.0	3.9	2.9	0.9	1.34	4.33

Table 7. - *Calliotropis ptykte* : Shells measurements in mm for types.

Discussion. *Calliotropis ptykte* n. sp. is close to *C. crystalophora* Marshall, 1979 from New Caledonia area, but this species has a larger H/W ratio, beads of spiral cords thicker and more spaced, axial ribs more spaced out, no S1, outermost basal spiral cords nearly smooth.

Regarding the number of primary spiral and basal cords, the new species may also be compared to *C. chuni* (von Martens, 1904) from eastern Africa, but this species has thicker, sharp and more spaced beads on spiral cords, lacks S1 and S3, has outermost smooth basal spiral cords and no spiral cord within the umbilicus.

Etymology. Pleated (Greek : πτυχτος) - with reference to the crowded axial ribs on the surface of the shell.

Calliotropis lamellifera Jansen, 1994

Figs 20-23

Calliotropis lamellifera Jansen, 1994: 51-52, pl. 2, figs c, d. Type locality: Eastern Australia (off New South Wales), 33°35-37'S, 152°05'E, 1106-1143 m.

Other reference :

Calliotropis lamellifera - Vilvens, 2006: 62, figs. 22-23.

Material examined. New Caledonia. BIOCAL: stn CP23, 22°46'S, 166°20'E, 2040 m, 1dd. - BATHUS 1: stn CP671, 20°51'S 165°28'E, 450-470 m, 1 dd, 2 dd juv. - BATHUS 3: stn CP844, 23°06'S, 166°46'E, 908 m, 1 dd.

Loyalty Basin. BIOGEOCAL: stn KG287, 20°43'S, 166°53'E, 1560 m, 1 dd juv.

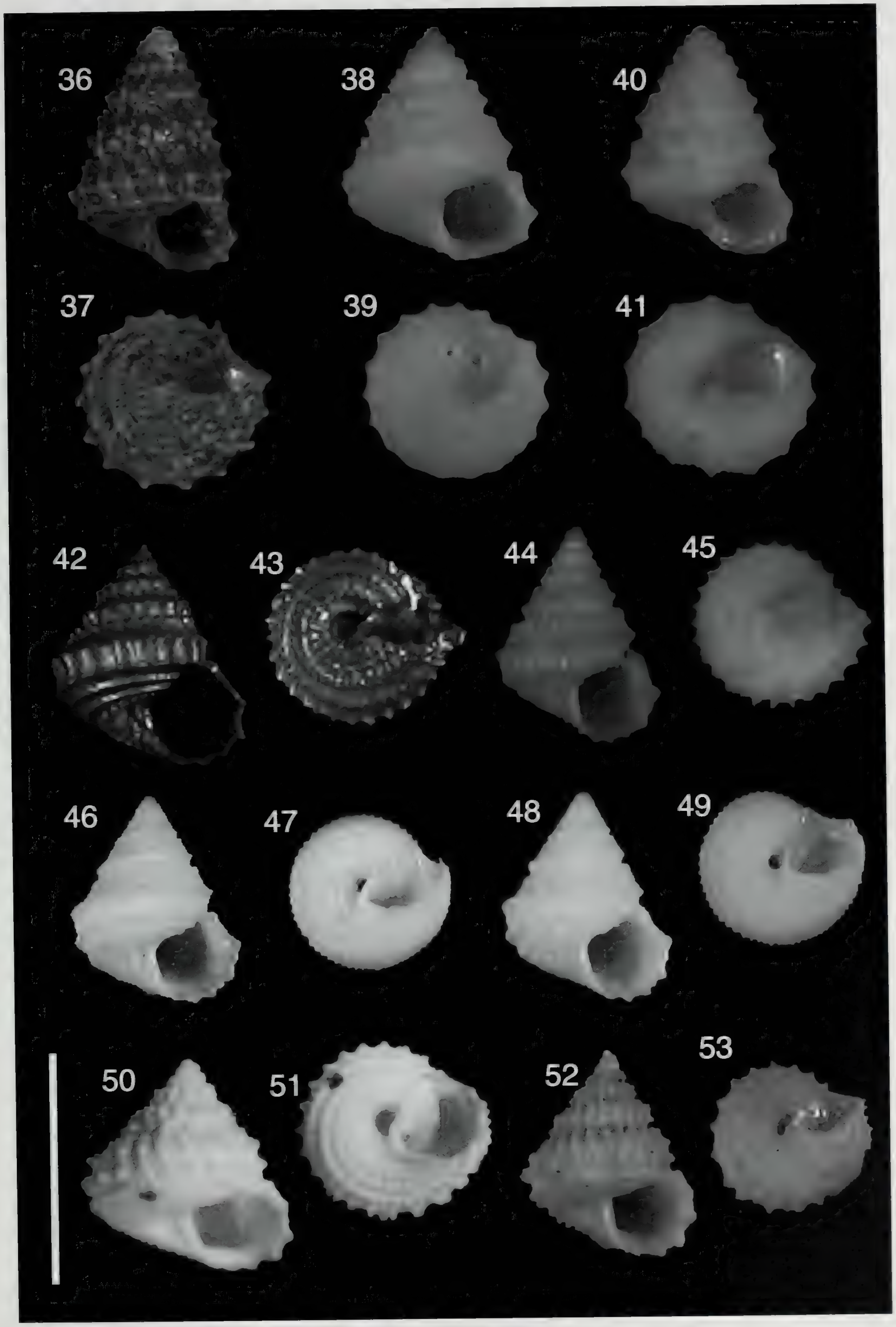
Figures 36-53. Scale bar = 5 mm.

36-41. *Calliotropis acherontis* Marshall, 1979
- **36-37.** MNHN, New Caledonia, 1060-1130 m [HALIPRO 2, stn BT102], 5.2 x 3.4 mm; **38-39.** MNHN, New Caledonia, 775 m [BIOCAL, stn DW48], 4.6 x 3.3 mm; **40-41.** MNHN, Wallis and Futuna Islands, 440-458 m [MUSORSTOM 7, DW608], 3.6 x 2.5 mm.

42-45. *C. crystalophora* Marshall, 1979.
- **42-43.** Holotype NMNZ (M230817), Raoul Island, 512-549 m, 4.0 x 3.5 mm; **44-45.** MNHN, New Caledonia, 735 m [BIOCAL, stn KG06], 4.6 x 2.5 mm.

46-49. *C. ptykte* n. sp.
- **46-47.** Holotype MNHN (9843), 4.6 x 4.5 mm; **48-49.** Paratype MNHN (9844), 4.5 x 4.4 mm.

50-53. *C. multisquamosa* (Schepman, 1908).
- **50-51.** Holotype ZMA (3.08.060), Indonesia, 4.7 x 4.8 mm; **52-53.** MNHN, New Caledonia, 270-282 m [BATHUS 1, stn DW688], 4.3 x 3.5 mm.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Distribution. Eastern Australia, 322-1330 m (Jansen, 1994) and New Caledonia area, 470-2040 m.

Remarks. This species was originally described from New South Wales and Queensland, and its distribution is now widened to New Caledonia area.

Calliotropis multisquamosa (Schepman, 1908)

Figs 50-53

Solariellopsis multisquamosa Schepman, 1908: 57, pl IV, fig. 7a-c. Type locality: Indonesia (Sula), 5°43.5'S, 119°44'E, 522 m.

Material examined. New Caledonia. SMIB 8: stn DW152-154, 23°18'S-23°19'S, 168°05'E, 305-367 m, 1 dd sub. - Stn DW170-172, 23°41'S, 168°00'E-168°01'E, 230-290 m, 1 dd. - Stn DW190, 23°18'S, 168°05'E, 305-310 m, 7 dd sub, 3 dd juv. - BATHUS 1: stn DW688, 20°33'S, 165°00'E, 270-282 m, 1 dd, 1 dd juv.

Distribution. Indonesia, 522 m (Schepman, 1908); New Caledonia, 282-305 m.

Remarks. The examination of the holotype shows that the main distinguishing features of *Calliotropis multisquamosa* (Schepman, 1908) are a small size (height about 5.5 mm), a moderately elevated spire, teleoconch up to 5 whorls, 3 sharp spiral cords on whorls (P2 and P3 the strongest, P1 appearing later, weaker), an additional P4 peripheral on last whorl, 3 granular spiral cords on the base and a shallow, wide umbilicus with 1 spiral cord inside.

The New Caledonian specimens map these features, except a slightly more elevated spire and the fact that P1 is lacking in subadult and juvenile specimens. So, despite the huge gap between New Caledonia and the type locality, there is no reason to not use this available name.

Calliotropis solomonensis n. sp.

Figs 54-57, Table 8

Type material. Holotype (4.4 x 3.7 mm) MNHN (9845). Paratypes: 6 MNHN (9846), 2 RMBR (ZRC.MOL.2768-2769), 1 coll. C.Vilvens.

Type locality. Solomon Islands, SALOMON 1: stn DW1855, 9°46.4'S, 160°52.9'E, 253-263 m.

Material examined. Solomon Islands. SALOMON 1: stn DW1817, 9°48.2'S, 160°54.3'E, 233-269 m, 1dd. - Stn DW1820, 9°52.3'S, 160°51.4'E, 256-329 m, 1 dd. - Stn DW1825, 9°50.5'S, 160°58.0'E, 340-391 m, 1 dd. - Stn DW1855, 9°46.4'S, 160°52.9'E, 253-263 m, 10 dd (holotype and paratypes). - Stn DW1856, 9°46.4'S, 160°52.3'E, 254-281 m, 1 dd. - Stn DW1762, 8°39.9'S, 160°03.9'E, 396-411 m, 2 dd.

Distribution. Solomon Islands, 263-396 m.

Diagnosis. A small off-white *Calliotropis* species with a moderately high spire, cyrtoconoidal shape, evenly spaced axial ribs on the whole surface, 4 granular spiral cords on last whorl, a shoulder at second cord; beads the two median cords sharp; base with 3 granular spiral cords; umbilicus with a spiral cord inside.

Description. *Shell* of small size for the genus (height up to 4.5 mm, width up to 4.1 mm), higher than wide, rather thick, cyrtoconoidal; spire high, height 1.0x to 1.2x width, 3.7x to 4.x aperture height; umbilicus moderately wide.

Protoconch about 250 µm, of 1 whorl, glassy, with a very weak terminal varix.

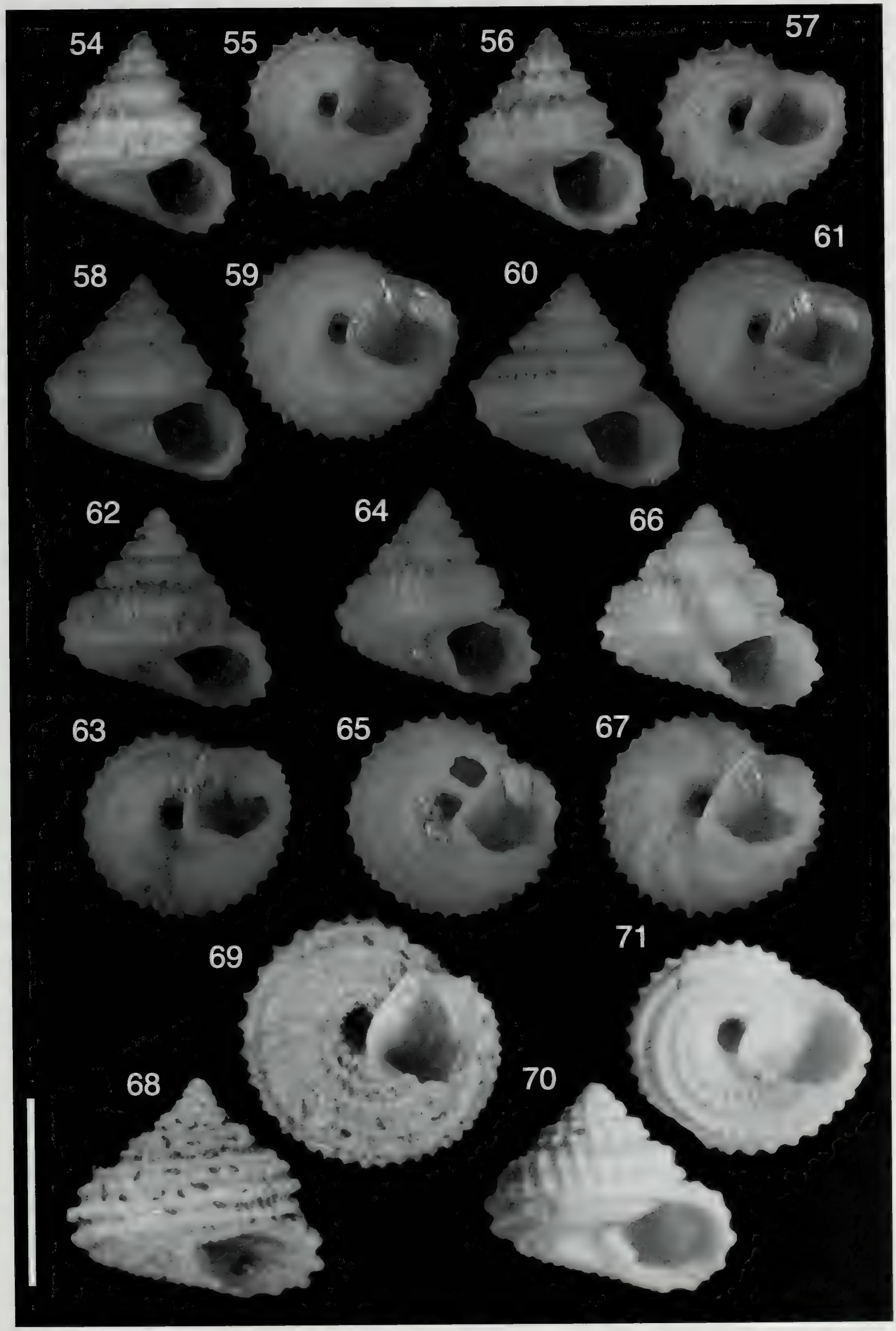
Teleoconch up to 5.7 convex whorls, bearing 3 spiral granular cords and prosocline ribs; nodules from cords produced by intersections with axial ribs.

Suture visible, impressed, not canaliculated.

First whorl convex, sculptured by about 12 prosocline smooth ribs, interspace between ribs 2.5x broader than ribs; P2 appearing almost immediately, P3 half a whorl later, both granular. On second whorl, P3 slightly stronger than P2; beads of P3 becoming weakly sharp; interspace between ribs 2x broader than ribs. On third whorl, beads of both P2 and P3 sharp; axial ribs thicker, more prosocline, distance between them as broad as ribs. On fourth whorl, P1 appearing, weaker than P2 and P3; shoulder appearing at P2; beads of P3 becoming scaly.

Figures 54-71. Scale bar = 5 mm.

54-57. *Calliotropis solomonensis* n. sp., Solomon Islands, 253-263 m [SALOMON 1, stn DW1855].
54-55. Holotype MNHN (9845), 4.4 x 3.7 mm; **56-57.** Paratype MNHN (9846), 4.5 x 3.9 mm.
58-61. *C. delli* Marshall, 1979.
58-59. MNHN, New Caledonia, 525-547 m [BATHUS 2, stn DW721], 4.7 x 4.6 mm; **60-61.** MNHN, New Caledonia, 610-660 m [BATHUS 4, stn DW919], 5.6 x 5.6 mm.
62-67. *C. echidnoides* n. sp.
62-63. Holotype MNHN (9847), 4.6 x 4.5 mm; **64-65.** Paratype MNHN (9848), 4.5 x 4.4 mm; **66-67.** MNHN, Tonga, 263-320 m [BORDAU 2, stn DW1602], 4.6 x 5.1 mm.
68-69. *C. echidna* Jansen, 1994, holotype AMS (C. 169582), Queensland, 115-124 m, 5.9 x 6.0 mm - Photographs taken by M.Allen, AMS.
70-71. *C. muricata* (Schepman, 1908), holotype ZMA (3.08.061), Indonesia, 5.4 x 4.3 mm.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On fifth whorl, beads of P2 also scaly; beads of P3 slightly stronger and more spiny than those of P2. On last whorl, P4 emerging from suture, granular, weaker than P2 and P3, with beads twice more numerous than those of P2 and P3; axial ribs still visible, thick, weakly prosocline.

Aperture subcircular; outer lip thickened, meeting inner lip with a weak obtuse angle.

Columella almost straight, oblique, without tooth.

Base weakly convex, almost flat, with 3 thick granular spiral cords; distance between cords similar in size to cords; axial ribs between cords, connecting beads of spiral cords.

Umbilicus rather wide, diameter ca. 20% of shell width, deep, funnel shaped with sloped walls, with thin, spaced ribs and 1 granular spiral cord inside.

Colour of teleoconch off-white; protoconch translucid white.

	TW	H	W	HA	H/W	H/HA
holotype	5.6	4.4	3.7	1.0	1.19	4.40
paratype MNHN 1	5.6	4.5	3.9	1.0	1.15	4.50
paratype MNHN 2	5.7	4.4	4.1	1.1	1.07	4.00
paratype MNHN 3	5.5	4.1	3.6	1.1	1.14	3.73
paratype MNHN 4	5.4	3.9	3.4	1.0	1.15	3.90
paratype MNHN 5	5.0	3.8	3.4	0.9	1.12	4.22
paratype MNHN 6	5.4	3.3	3.1	0.8	1.06	4.13
paratype RMBR 1	5.6	4.2	3.9	1.1	1.08	3.82
paratype RMBR 2	5.5	3.2	3.3	0.8	0.97	4.00
paratype CV	5.4	3.6	3.6	0.8	1.00	4.50

Table 8. - *Calliotropis solomonensis* : Shells measurements in mm for types.

Discussion. *Calliotropis solomonensis* n. sp. differs from *C. multisquamosa* (Schepman, 1908) (Figs 50-53) by the conspicuous shoulder at P2 and the more vertical walls of the umbilicus. Both are close to *C. muricata* (Schepman, 1908) (Figs 70-71) from Indonesia, but this species has a more depressed spire, two columellar denticles and two (instead of only one) spiral cords within the umbilicus.

Etymology. After type locality and known distribution restricted to Solomon Islands area.

Calliotropis echidnoides n. sp.

Figs 62-67, Table 9

Type material. Holotype (4.6 x 4.5 mm) MNHN (9847). Paratypes: 4 MNHN (9848), 1 NMNZ (M.273551).

Type locality. Fiji, BORDAU 1, stn DW1464, 18°09'S, 178°38'W, 285-300 m.

Material examined. New Caledonia. LAGON: stn 9, 22°20'S, 167°10'E, 175-200 m, 1 dd. - SMIB 5: stn DW82, 22°32'S, 167°32'E, 155 m, 1 dd. - BATHUS 1: stn CP712, 21°44'S, 166°35'E, 210 m, 1 dd. - BATHUS 2: stn DW715, 22°39'S, 167°11'E, 202-227 m, 2 dd. - Stn DW724, 22°48'S, 167°26'E, 344-358 m, 2 dd, 1 dd juv. - BATHUS 2/MUSORSTOM 8, 9 dd.

Fiji. MUSORSTOM 10: stn DW1370, 18°18.7'S, 178°09.1'E, 497-504 m, 4 dd, 2 dd juv. - Stn DW1377, 18°18.4'S, 178°02.5'E, 233-248 m, 1 dd. - Stn DW1383, 18°18.4'S, 178°02.6'E, 230-251 m, 10 dd, 6 dd sub. - BORDAU 1: stn DW1450, 16°44'S, 179°58'E, 327-420 m, 2 dd. - Stn DW1464, 18°09'S, 178°38'W, 285-300 m, 19 dd (holotype and paratypes). - Stn DW1465, 18°09'S, 178°39'W, 290-300 m, 5 dd.

Loyalty ridge. MUSORSTOM 6: stn DW461, 21°06'S, 167°26'E, 240 m, 1 dd. - Stn DW462, 21°05'S, 167°27'E, 200 m, 1dd. - Stn DW1499, 18°40'S, 178°27'W, 389-400 m, 1 dd.

Tonga. BORDAU 2: stn DW 1540, 21°15'S, 175°14'W, 476-478 m, 1 dd. - Stn DW 1548, 20°38'S, 175°03'W, 476-478 m, 2 dd. - Stn DW1581, 18°41'S, 174°02'W, 76-85 m, 2 dd. - Stn DW1587, 18°37'S, 173°54'W, 309-400 m, 3 dd, 1 dd juv. -Stn DW1589, 18°39'S, 173°54'W, 281 m, 1 dd. - Stn DW1602, 20°49'S, 174°57'W, 263-320 m, 2 dd.

Distribution. South-western Pacific (from New Caledonia to Tonga), 248-344 m.

Diagnosis. A small *Calliotropis* species with moderately high spire, conical shape, silvery pink, with axial ribs on the whole surface, 2 granular spiral cords on first spire whorls, a keel at the abapical cord; 5 spiral cords on last whorl; base with 3 granular spiral cords; umbilicus with 2 or 3 spiral cords inside.

Description. *Shell* of small size for the genus (height up to 4.8 mm, width up to 4.7 mm), almost as broad as high, rather thin, conical or slightly cyrtoconoidal; spire moderately high, height 0.9x to 1.1x width, 3.4x to 4.6x aperture height; umbilicus rather narrow.

Protoconch from 150 to 180 µm, of 1 whorl, more or less glassy, with a very weak terminal varix.

Teleoconch up to 6 weakly convex whorls, bearing up to 5 spiral granular cords and prosocline ribs; nodules from cords produced by intersections with axial ribs.

Suture impressed, not canaliculated.

First whorl convex, sculptured by about 12 to 15 prosocline smooth ribs, interspace between ribs 1.5x to 2x broader than ribs; primary spiral cords P1 and P3 appearing almost immediately, both weak, poorly visible and granular; P2 absent. On second whorl, P3 slightly stronger than P1 and more visible. On third whorl, beads of P3 slightly blunt sharp, like beads of P1 half a whorl later; axial ribs thicker, more prosocline, distance between them 1.5x broader than ribs. On fourth whorl, beads of both cords stronger; beads of P1 oriented at 45°, beads of P3 horizontally oriented; P1 producing a shoulder with an almost horizontal ramp and P3 producing a strong keel. At end of fourth or at begin of fifth whorl, P1 dividing into two cords, the abapical one stronger; beads of P3 becoming weakly scaly; S1 appearing at end of fifth whorl or at begin of sixth, weak, granular. On last whorl, P4 emerging from suture, slightly weaker than P1; adapical P1 becoming as strong as abapical P1; P3 the strongest, with blunt scaly beads.

Aperture subcircular, inclined backward; outer lip rather thick, meeting inner lip with an obtuse angle.

Columella curved at fist third, oblique, with a blunt, more or less conspicuous, basal tooth.

Base weakly convex or almost flat, with 3 thick granular spiral cords; distance between cords similar in size to cords; axial ribs between cords, connecting beads of spiral cords.

Umbilicus rather narrow, diameter measuring ca. 15% of shell width, rather deep, funnel shaped, with strong axial ribs and 2, sometimes 3, granular spiral cords inside.

Colour of teleoconch silvery pink to pearly silver; broad, oblique, light brown flames on some specimens from Tonga; protoconch white.

	TW	H	W	HA	H/W	H/HA
holotype	6.1	4.6	4.5	1.0	1.02	4.60
paratype MNHN 1	6.0	4.8	4.7	1.1	1.02	4.36
paratype MNHN 2	5.5	4.2	4.4	1.0	0.95	4.20
paratype MNHN 3	5.9	4.8	4.4	1.4	1.09	3.43
paratype MNHN 4	5.8	4.4	4.3	1.3	1.02	3.38
paratype NMNZ	6.0	4.5	4.4	1.1	1.02	4.09

Table 9. - *Calliotropis echidnoides* : Shells measurements in mm for types.

Discussion. *Calliotropis echidnoides* n. sp. is close to *C. echidna* Jansen, 1994 (Figs 68-69) from eastern Australia, but this slightly taller species has a spire with first part coeloconoidal and second part cyrtoconoidal, no S1, all beads of spiral cords strongly spiny and a notch under the basal columellar tooth. The two species occupies adjacent areas whose southern New Caledonia area is the border line.

The new species may also be compared to *C. muricata* (Schepman, 1908) (Figs 70-71) from Indonesia, but this species has a more depressed spire, different ontogeny of spiral cords of whorls and two columellar denticles (instead of a single basal tooth).

C. echidnoides n. sp. also weakly remembers *C. malapascuensis* Poppe, Tagaro & Dekker, 2006, described from a single specimen from Philippines, but this similar in size species has only 3 spiral cords, the nodules of P1 and P2 being much bigger than on the cords of the new species, and only one spiral cord inside the umbilicus.

Etymology. After the close species *C. echidna* Jansen, 1994.

Calliotropis stanyii Poppe, Tagaro & Dekker, 2006
Figs 194-197

Calliotropis stanyii Poppe, Tagaro & Dekker, 2006: 56-57, pl. 21, fig. 1. Type locality: Philippines, off Balicasag, no depth cited.

Material examined. Solomon Islands. SALOMON 1: stn CP1798, 9°21.0'S, 160°29.2'E, 513-564 m, 53 lv.

Distribution. Philippines, 242-760 m (Poppe et al., 2006); Solomon Islands, alive in 513-564 m

Remarks. This species was described from Philippines and the record in Solomon Islands is new, giving a distribution that is provisionally disjoint. The weak differences between specimens from Philippines and those from Solomon Is. are that the latter have a less elevated spire, slightly stronger beads on P1 and P2, and a reddish brown colour (not light brown). Almost all of the specimens from Solomon Is. have 3 spiral cords on the base, but we found also at least one specimen with four, as it happens for the Philippine specimens. Such differences seems not to be significant enough to justify the description of a new subspecies.

Calliotropis derbiosa Vilvens, 2004
Figs 74-75

Calliotropis derbiosa Vilvens, 2004: 22-24, figs. 9-12. Type locality: Vanuatu, 18°52'S, 168°55'E, 748-775 m.

Material examined. Vanuatu. BIOCAL: stn CP62, 24°19'S, 167°49'E, 1395-1410 m, 1dd. - MUSORSTOM 8: stn CP992, 18°52'S, 168°55'E, 748-775 m, 2 dd sub, 3 dd juv.
New Caledonia. BIOCAL: stn CP75, 22°19'S, 167°23'E, 825-860 m, 6 dd, 1 dd sub, 1 dd juv.
Loyalty Ridge. MUSORSTOM 6: stn DW488, 20°49'S, 167°06'E, 800 m, 1 dd sub.
Loyalty Basin. BIOGEOCAL: stn DW296, 20°38'S, 167°10'E, 1230-1270 m, 1 dd juv.
Fiji. MUSORSTOM 10: stn DW1331, 17°02.4'S, 178°01.8'E, 694-703 m, 1 dd. - Stn CP1346, 17°19.6'S, 178°32.4'E, 673-683 m, 1 dd juv. - Stn DW1353, 17°30.9'S, 178°53.3'E, 879-897 m, 1 dd. - BORDAU 1: stn DW1413, 16°10'S, 179°24'W, 669-676 m, 14 dd.

Distribution. South-western Pacific (from New Caledonia to Fiji), 800-1230 m (range computed using also the material examined by Vilvens, 2004).

Remarks. Juvenile specimens from New Caledonia seem to be more depressed, but share the same ontogeny of cords as the types (P2 absent, S1 appearing late).

Calliotropis micraulax Vilvens, 2004
Figs 72-73

Calliotropis micraulax Vilvens, 2004: 19-22, figs. 1-4. Type locality: southern New Caledonia, 22°11'S, 165°59'E, 1060-1450 m.

Material examined. New Caledonia. BIOCAL: stn CP26, 22°40'S, 166°27'E, 1618-1740 m, 1 dd sub, 2 dd juv. - BATHUS 2: stn DW743, 22°36'S, 166°26'E, 713-950 m, 1 dd.
Loyalty Basin. BIOGEOCAL: stn CP214, 22°43'S, 166°28'E, 1590-1665 m, 1 dd sub. - Stn KG222, 22°45'S, 166°25'E, 1675 m, 1 dd juv. - Stn CP232, 21°34'S, 166°27'E, 760-790 m, 2 dd, 5 dd juv. - Stn CP260, 21°00'S, 166°58'E, 1820-1980 m, 2 dd sub, 1 dd juv. - Stn CP273, 21°02'S, 166°57'E, 1920-2040 m, 1 dd.
Loyalty Ridge. MUSORSTOM 6: stn CP438, 20°23'S, 166°20'E, 780 m, 1 dd.
Chesterfield, Coral Sea. MUSORSTOM 5: stn 324, 21°15'S 157°51'E, 970 m, 2 dd sub.

Distribution. South-western Pacific (from Chesterfield to Vanuatu), 780-1280 m (range computed using also the material examined by Vilvens, 2004).

Calliotropis midwayensis (Lan, 1990)
Figs 88-95

Omphalotukaia midwayensis Lan, 1990: 1-3, 1 pl, 3 figs. Type locality: Central Pacific, Midway Islands, 600 m.

Material examined. Taiwan, South China Sea. TAIWAN 2000: stn CP23, 22°11.9'S, 120°02.9'E, 876 m, 10 lv & 2 dd sub. - Stn CP32, 22°01.7'S, 120°16.4'E, 904 m, 1 dd.

Figures 72-87. Scale bar = 5 mm.

72-73. *Calliotropis micraulax* Vilvens, 2004, holotype MNHN, southern New Caledonia, 1060-1450 m [BATHUS 2, stn CP767], 20.1 x 21.7 mm.
74-75. *C. derbiosa* Vilvens, 2004, holotype MNHN, Vanuatu, 748-775 m, [MUSORSTOM 8, stn CP992], 22.3 x 25.4 mm.
76-79. *C. basileus* Vilvens, 2004.
76-77. Holotype MNHN, Fiji, 556-560 m [BORDAU 1, stn CP1462], 21.8 x 26.3 mm; **78-79.** MNHN, specimen with umbilicus covered by a callus, Norfolk Ridge, 950-980 m [BATHUS 3, stn CP822], 17.7 x 24.4 mm.
80-83. *C. galea* (Habe, 1953), NSMT (Mo.73706), Japan, Honshu, Wakayama Pref. **80-81.** 13.2 x 8.6 mm; **82-83.** 13.8 x 8.5 mm.
84-85. *C. infundibulum* (Watson, 1879), MNHN, Loyalty Basin, 2350 m [BIOGEOCAL, stn CP250], 12.9 x 12.0 mm.
86-87. *C. hataii* Rehder & Ladd, 1973, MNHN, south-western Pacific, 1280-1300 m [MUSORSTOM 7, stn CP621], 12.6 x 13.1 mm.

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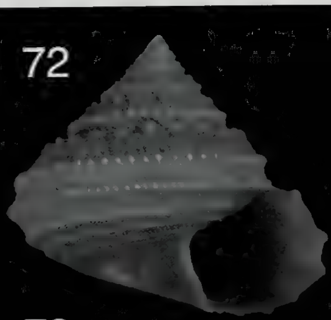

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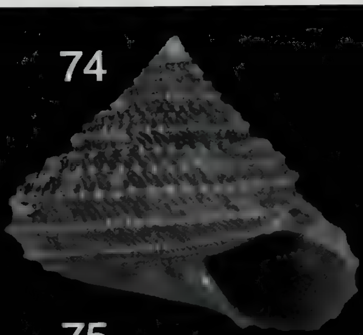

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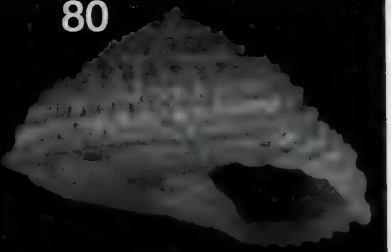

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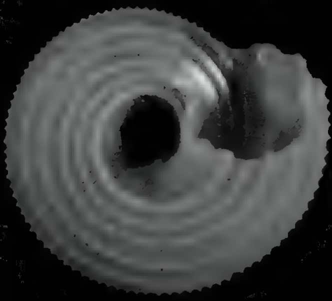

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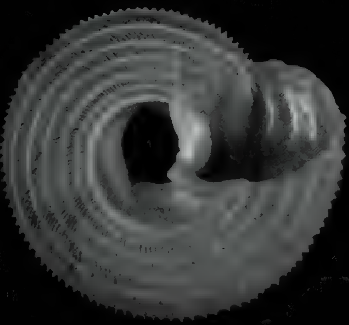

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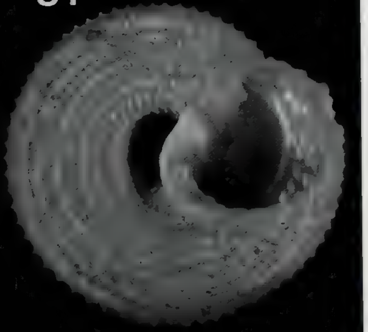

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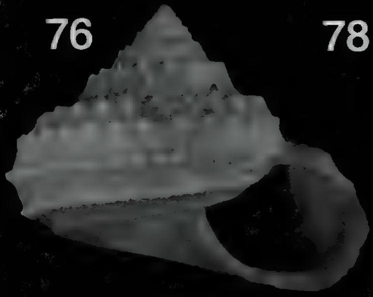

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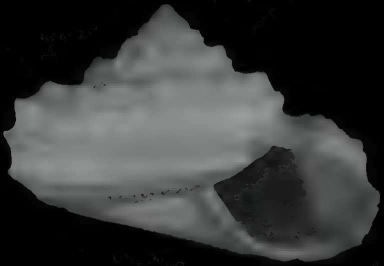

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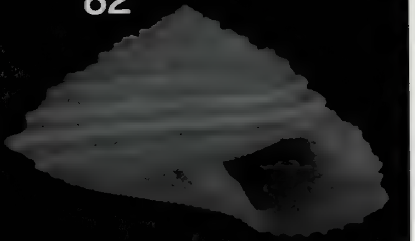

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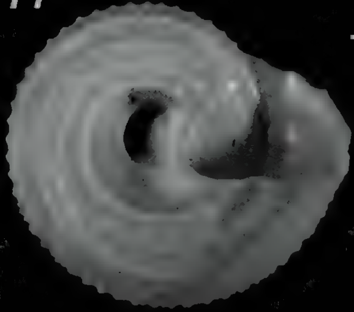

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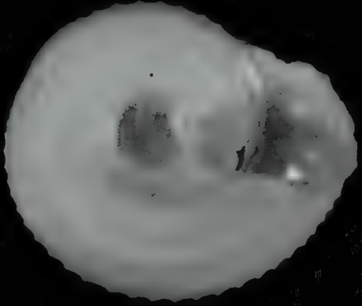

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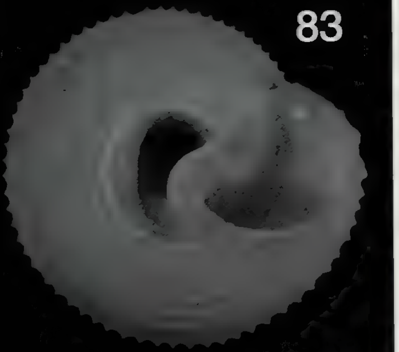

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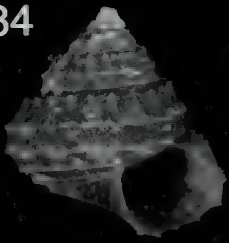

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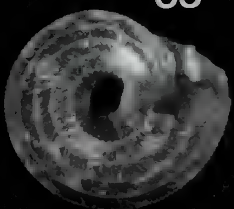

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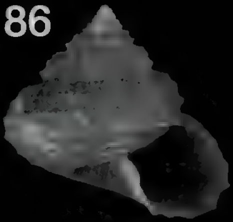

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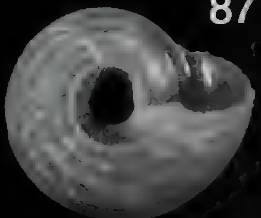


Distribution. Midway Islands, 600 m and Taiwan, 876-904 m.

Remarks. This species was originally described from the central Pacific as a Calliostomatidae, but clearly belongs to the genus *Calliotropis*. Following the original description (types were not available), the main distinguishing features of *Calliotropis midwayensis* (Lan, 1990) are a relatively large size (height about 21 mm), a moderately elevated spire, a teleoconch up to 7 whorls with one subsutural and one peripheral spiral cords, both granular, thick axial ribs, about 7 thin spiral cords on the base and a deep and wide umbilicus without spiral cord inside.

Although there is a huge gap between the area where the Taiwanese material is coming from and the type locality (can one imagine that the types shells were brought by the Taiwanese boat of which dredging revealed the species ?), in absence of soft parts, I see no reason to discriminate the examined specimens from *C. midwayensis*.

Some precisions can be given for the examined shells. Regarding the spiral cords on the whorls, P1 and P3 appear at end of first whorl and they become obsolete after the third whorl, P3 disappearing and P1 at most visible as a weak, low cord; P4 appears at third whorl, granular, with widely spaced, small, prickly granules; P2 is absent. Another feature that not appears in the original description is that some specimens develop a columellar callus covering partially or totally the umbilicus (Figs 92-95).

Calliotropis asphales n. sp.

Figs 96-99, Table 10

Type material. Holotype (23.5 x 27.4 mm) MNHN (9849). Paratypes: 4 MNHN (9850).

Type locality. Solomon Islands, SALOMON 1, stn CP1751, 9°10.4'S, 159°53'E, 749-799 m.

Material examined. Solomon Islands. SALOMON 1: stn CP1749, 9°20.9'S, 159°56.2'E, 582-594 m, 3 dd juv. - Stn CP1751, 9°10.4'S, 159°53'E, 749-799 m, 5 lv (holotype and paratypes), 2 dd sub & 4 dd juv. - Stn CP1786, 9°21.3'S, 160°24.6'E, 387 m, 1 lv juv.

Distribution. Solomon Islands, alive in 387-749 m.

Diagnosis. A rather big *Calliotropis* species with a moderately elevated, more or less conical spire, nut-brown, with 3 granular spiral cords on whorls; cords rather similar in strength but with a number of beads on last whorls decreasing from adapical to abapical cord; beads of the two abapical cords scaly; base with 4 or 5 granular spiral cords; large umbilicus without spiral cord inside.

Description. *Shell* of rather large for the genus (height up to 23.8 mm, width up to 27.4 mm), broader than high, rather thick, conical to weakly cyrtoconoidal; spire moderately elevated, height 0.8x to 0.9x width, 2.6x to 3.4x aperture height; broad umbilicus.

Protoconch of about 300 µm, of 1 whorl, dome-shaped, without terminal varix, always damaged in large specimens.

Teleoconch up to 7.9 weakly flat to slightly convex whorls, bearing 3 spiral granular cords; nodules from cords produced by intersections with axial ribs that are quickly obsolete after first whorls; secondary thin axial ribs on abapical part of next whorls.

Suture impressed, not canaliculated.

First whorl convex, sculptured by 15 orthocline smooth ribs, interspace between ribs from 2.5x to 3x broader than ribs; primary spiral cords P1 and P3 appearing almost immediately, granular; P1 weaker than P3. On second whorl, P1 and P3 thicker, similar in size; interspace between prosocline ribs 2.5x broader than ribs. On third whorl, P3 slightly stronger than P1, with granules slightly sharp; P4 emerging from suture, granular, similar in strength to P3; P2 absent. On fourth whorl, beads of P3 strongly sharp, oriented at 45°; beads of P4 sharp, 2x more numerous than beads of P3; P1 much weaker than P3 and P4; axial ribs obsolete. On fifth and following whorls, beads of P3 and P4 scaly; beads of P4 much closer to each other; secondary thin axial ribs in subsutural area and between P3 and P4; beads of P1 becoming more visible, large, isolated, not scaly. On last whorl, P4 peripheral; area between P3 and P4 slightly concave.

Aperture subelliptic; outer lip slightly flaring, meeting inner lip with an obtuse, poorly marked angle.

Columella curved at first third, oblique, reflected into umbilicus, without basal tooth.

Figures 88-101. Scale bar = 5 mm.

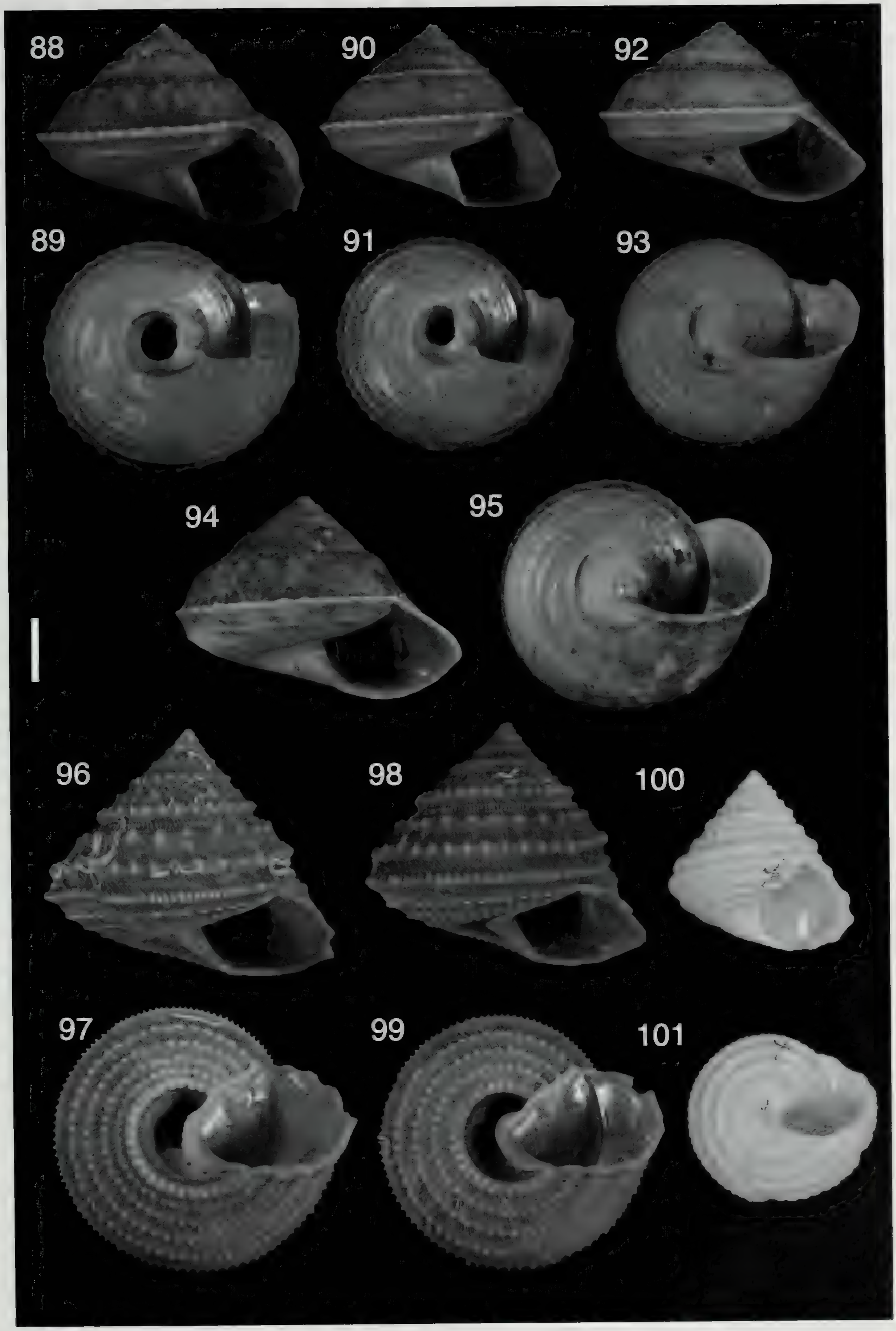
88-95. *Calliotropis midwayensis* (Lan, 1990), MNHN, Taiwan, South China Sea, 876 m [TAIWAN 2000, stn CP23].

88-89. Opened umbilicus, distinct keel, 16.9 x 21.6 mm; **90-91.** Opened umbilicus, globose shape, 14.4 x 18.6 mm; **92-93.** Umbilicus filled by columellar callus, globose shape, 14.5 x 21.0 mm; **94-95.** Umbilicus filled by columellar callus, more distinct keel, 17.0 x 23.1 mm.

96-99. *C. asphales* n. sp., Solomon Islands, 749-799 m [SALOMON 1, stn CP1751].

96-97. Holotype MNHN (9849), 23.5 x 27.4 mm; **98-99.** Paratype MNHN (9850), 23.6 x 27.4 mm.

100-101. *C. granolirata* (Sowerby, 1903), syntype NHM (1903.7.27.65), South Africa, 13.0 x 12.0 mm.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Base moderately convex, with 4 or 5 granular spiral cords, innermost cord stronger and bordering umbilicus; distance between cords more or less similar in size to cords; very thin, crowded axial ribs between cords, not connecting beads of spiral cords (about five in number for one bead).

Umbilicus broad, diameter ca. 30% of shell width, deep, funnel shaped, with thin axial ribs only at rim and without spiral cord inside.

Colour of teleoconch and protoconch nut-brown.

	TW	H	W	HA	H/W	H/HA
holotype	7.9	23.5	27.4	7.0	0.86	3.36
paratype MNHN 1	7.4	23.6	27.4	7.4	0.86	3.19
paratype MNHN 2	7.7	22.8	26.9	6.7	0.85	3.40
paratype MNHN 3	7.4	23.8	26.1	8.3	0.91	2.87
paratype MNHN 4	7.5	19.4	22.6	7.4	0.86	2.62

Table 10. - *Calliotropis asphales* : Shells measurements in mm for types.

Discussion. The combination of a large size, a solid shell with a conical spire, a missing P2 with scaly P3 and P4 makes *Calliotropis asphales* n. sp. hard to confuse with another *Calliotropis* species.

Reagarding the conical shape and the number of spiral cords, the new species can be compared to *C. micraulax* Vilvens, 2004 (Figs 72-73) from New Caledonia and Vanuatu, but this similar in size species has spiral cords with much thinner, more regular, never scaly beads, thin axial prosocline threads on the whole surface and much thinner spiral cords on the base with wider interspace between them.

Considering the same criteria, *C. asphales* n. sp. also remembers *C. granolirata* (Sowerby, 1903) (Figs 100-101) from South Africa, but this slightly smaller species lacks an umbilicus, has a more elevated spire, two abapical spiral cords with prosocline elongated beads and basal spiral cords with axially elongated beads.

Etymology. Strong (Greek : ασφαλης) - with reference to the stocky shape of the shell.

Calliotropis glypta (Watson, 1879)
Figs 204-207

Trochus glyptus Watson, 1879: 694. Type locality: South-western Australia, New South Wales, off Sydney, 34°13'S, 151°38'E, 750 m.

Other references :

Calliotropis glyptus - Marshall, 1979: figs. 2J-L.

Calliotropis glyptus - Kaicher, 1990: 5694.

Calliotropis glypta - Jansen, 1994: 44-46, pl. 1, figs. a-b.

Calliotropis glyptus - Vilvens, 2004: figs. 5-6.

Material examined. New Caledonia. BATHUS 2(MUSORSTOM 8?): stn unknown, 1 dd. **Fiji.** MUSORSTOM 10: stn DW1314, 17°16.1'S, 178°14.8'E, 656-660 m, 2 dd, 1 dd juv. **Vanuatu.** MUSORSTOM 8: stn DW1128, 16°02'S, 166°38'E, 778-811 m, 1 dd.

Distribution. South-western Pacific (from eastern Australia to Fiji), 660-835 m (range computed using also the material examined by Jansen, 1994).

Remarks. This species was originally described from New South Wales (off Sydney). The new records extend the distribution area. The only differences of these new specimens with Australian specimens and the original description are an intermediate spiral cord P2 stronger than usual and 6 (not 5) spiral cords on the base.

Calliotropis basileus Vilvens, 2004
Figs 76-79

Calliotropis basileus Vilvens, 2004: 24-26, figs. 13-16. Type locality: Fiji, 18°09'S, 178°44'W, 556-560 m.

Material examined. New Caledonia. BATHUS 3: stn CP822, 23°20'S, 167°57'E, 950-980 m, 1 dd.

Distribution. South-western Pacific (from New Caledonia to Fiji), 750-830 m (range computed using also the material examined by Vilvens, 2004).

Remarks. This ivory specimen has a more depressed spire and a umbilicus fully (not partially) closed by a septum, but match all other distinctive criteria of the species.

Calliotropis blacki Marshall, 1979
Figs 198-201

Calliotropis blacki Marshall, 1979: 527, figs. 2M-O. Type locality: Kermadec Islands (Raoul Is.), 29°16.5'S, 177°49.5'W, 512-549 m.

Other references :

Calliotropis blacki - Vilvens, 2004: figs. 7-8.

Calliotropis blacki - Vilvens, 2005: figs. 13-14.

Material examined. New Caledonia. MUSORSTOM 4: stn DC168, 18°48'S, 163°11'E, 720 m, 2 dd. - **Fiji.** BORDAU 1: stn CP1415, 16°31'S, 179°00'W, 670-682 m, 1 dd. - Stn DW1458, 17°22'S, 179°28'W, 1216-1226 m, 1 dd. - **Wallis Island.** MUSORSTOM 7: stn DW578, 13°08'S, 176°16'W, 640-730 m, 1 dd, 2 dd juv.

Distribution. South-western Pacific (from New Caledonia to Fiji and Kermadec Is.), 549-720 m (range computed using also the material examined by Marshall, 1979).

Calliotropis pistis n. sp.

Figs 176-179, Table 11

Type material. Holotype (9.3 x 11.5 mm) MNHN (9851). 2 paratypes MNHN (9852).

Type locality. New Caledonia, Loyalty Ridge, MUSORSTOM 6, stn CP438, 20°23'S, 166°20'E, 780 m.

Material examined. New Caledonia. MUSORSTOM 4: stn DC168, 18°48'S, 163°11'E, 720 m, 1 dd.
Loyalty Ridge. MUSORSTOM 6: stn CP438, 20°23'S, 166°20'E, 780 m, 1 dd (holotype). - BATHUS 3: stn DW776, 23°44'S, 170°08'E, 770-830 m, 2 dd (paratypes). - Stn DW777, 24°44'S, 170°07'E, 770-800 m, 1 dd.
Norfolk Ridge. BATHUS 3: stn DW790, 23°49'S, 169°48'E, 685-715 m, 1 dd juv.

Distribution. New Caledonia area, 715-780 m.

Diagnosis. A medium size *Calliotropis* species with a moderately elevated, cyrtoconoidal spire, a subangular periphery and 6 granular spiral cords with sharp beads on last whorl; 3 adapical cords similar in size and number of beads; size of beads of cords decreasing in size and number of them increasing from fourth cord to sixth cord; thin, crowded, somewhat lamellose, prosocline threads between cords; base slightly convex with 8 or 9 granular spiral cords; broad umbilicus without spiral cord inside.

Description. *Shell* of medium size for the genus (height up to 10.1 mm, width up to 12.8 mm), broader than high, rather thin, slightly cyrtoconoidal; spire moderately elevated, height 0.8x width, 2.6x to 2.9x aperture height; broad umbilicus.

Protoconch of about 350 µm, of 1 whorl, glassy, without distinct terminal varix.

Teleoconch up to 6.0 convex whorls, bearing up to 6 prickly spiral cords different in size; nodules from cords produced on first whorls by intersections with axial ribs; axial sculpture on last whorls consisting in thin, crowed, prosocline threads in area between spiral cords.

Suture visible, weakly canaliculated.

First whorl convex, sculptured by about 15 slightly prosocline smooth ribs; interspace between ribs ca. 2x broader than ribs; primary cord P3 appearing almost immediately; P2 appearing at mid whorl, weaker than P3; beads of cords already bluntly sharp at mid whorl for P3, at end for P2. On second whorl, P2 and P3 stronger, spiny, similar in size. On third whorl, P1 appearing, staying weaker than other cords; P2 closer to P1 than to P3; beads of P2 and P3 similar in size and very acutely pointed; interspace between ribs 2x broader than ribs. On fourth whorl, S1 separating from P1; beads of P3 more pointed than those of other cords; P4 emerging from suture, beads more or less similar in size to those of P2. On fifth whorl, P1 dividing into two similar cords; beads of P3 and P4 slightly more numerous than those of other cords; primary axial sculpture becoming obsolete, crowded prosocline threads appearing in whole area between P3 and P4, and partially between P2 and P3. On last whorl, P4 peripheral; three adapical cords closely packed; beads of spiral cords decreasing in strength and size from adapical to abapical cord, crowded beads of P4 about 2x more numerous and smaller than those of P1 and S1; thin, prosocline threads present on almost the whole surface between all cords.

Aperture subcircular; outer lip thin, meeting inner lip with an obtuse angle.

Columella more or less straight, oblique, without tooth.

Base moderately convex, with 8 or 9 granular spiral cords; distance between cords similar in size to cords; axial ribs between spiral cords very weak, connecting beads of spiral cords.

Wide umbilicus, diameter measuring ca. 25% of shell width, deep, funnel shaped, with rather steep sloping walls and without spiral cord within.

Colour of teleoconch and protoconch light brown.

	TW	H	W	HA	H/W	H/HA
holotype	5.9	9.3	11.5	3.6	0.81	2.58
paratype MNHN 1	5.9	10.0	12.9	3.4	0.78	2.94
paratype MNHN 2	5.7	9.3	11.1	3.4	0.84	2.74
specimen DC168	6	10.1	12.9	3.8	0.78	2.66

Table 11. - *Calliotropis pistis* : Shells measurements in mm for types and some specimens.

Discussion. The new species has obvious differences regarding allied species whose characteristics are constant. That is, *Calliotropis pistis* is close to *C. blacki* Marshall, 1979 (Figs 198-201) from Kermadec Islands and New Caledonia, but this slightly bigger species lacks the spiral cord S1 and has only 4 spiral cords on the base. Also, *C. pistis* is close to *C. abyssicola* Rehder & Ladd, 1973 from central Pacific, but this species (of which all specimens described lacks protoconch and first whorl) is more depressed and has only up to 4 spiral cords on the last whorl.
The new species may remember *C. keras* n. sp. (Figs 212-213) from Fiji and Tonga, but this species is much more depressed, always lacks the spiral cord S1, has only 5 spiral cords on the base and a spiral cord inside the umbulicus.
The new species may also be compared to *C. derbiosa* Vilvens, 2004 (Figs 74-75) from Vanuatu and Fiji, but this species has a conical or slightly coeloconoidal shape, only 4 spiral cords on the whorls and only 6 spiral cords on the base.

Etymology. Loyalty (Greek : πιστις), used as a noun in apposition - with homonymous reference to type locality of the new species.

Calliotropis boucheti
Poppe, Tagaro & Dekker, 2006
Figs 208-209

Calliotropis boucheti Poppe, Tagaro & Dekker, 2006: 57-58, pl. 22, fig. 3. Type locality: Philippines, Mindoro, 13°44'N, 120°32'E, 682-770 m.

Material examined. Taiwan, South China Sea. TAIWAN 2000: stn DW46, 22°51.9'S, 121°25.3'E, 554 m, 1 dd.

Distribution. Philippines, 682-770 m and Taiwan, 554 m.

Remarks. This single specimen, with a protoconch damaged, matches the original description of the Philippine species, except that it has 5 (not 4) spiral cords on the base and a spiral cord inside the umbilicus.

Calliotropis dicrous n. sp.
Figs 202-203, Table 12

Type material. Holotype (10.2 x 12.9 mm) MNHN (9853). Paratypes : 2 MNHN (9854).

Type locality. Solomon Islands, SALOMON 1, stn CP1858, 9°37.0'S, 160°41.7'E, 435-461 m.

Material examined. Solomon Islands. SALOMON 1: stn CP1751, 9°10.4'S, 159°53'E, 749-799 m, 4 dd sub. - Stn CP1858, 9°37.0'S, 160°41.7'E, 435-461 m, 3 dd, 1 dd juv (with holotype and paratypes).

Distribution. Solomon Islands, 461-749 m.

Diagnosis. A beige *Calliotropis* species of moderate size, with a coeloconoidal, moderately high spire, an angulated periphery and 2 granular spiral cords on whorls, respectively subsutural and median on first spire whorls and both suprasutural on last whorls; base with 4 or 5 granular spiral cords; broad umbilicus without spiral cord inside.

Description. *Shell* of medium size for the genus (height up to 10.2, width up to 12.9 mm), broader than high, rather thin, coeloconoidal; spire moderately elevated, height 0.8x width, 3.6x to 3.9x aperture height; broad umbilicus.

Figures 102-119. Scale bar = 5 mm.

102-105. *Calliotropis cycloeides* n. sp.
102-103. Holotype MNHN (9870), 392-407 m [BORDAU 1, stn DW1463], 5.0 x 7.1 mm; **104-105.** Paratype MNHN (9872), 402-410 m [BORDAU 1, stn DW1423], 4.9 x 7.1 mm.
106-107. *C. bucina* Vilvens, 2006, MNHN, Solomon Islands, 513-564 m [SALOMON 1: DW1768], 2.8 x 5.1 mm.
108-111. *C. coopertorium* n. sp.
108-109. Holotype MNHN (9860), 295-302 m [MUSORSTOM 10, stn DW1365], 2.8 x 3.3 mm; **110-111.** MNHN, Vanuatu, 205-210 m [MUSORSTOM 8, stn CP1101], 2.9 x 3.5 mm.
112-115. *C. pyramoeides* n. sp.
112-113. Holotype MNHN (9858), 200 m [MUSORSTOM 6, stn DW442], 3.6 x 3.9 mm; **114-115.** Paratype MNHN (9859), 240 m [MUSORSTOM 6, stn DW461], 3.6 x 3.9 mm.
116-119. *C. scalaris* Lee & Wu, 2001.
116-117. MNHN, Indonesia, Tanimbar Islands, 603-620 m [KARUBAR, stn CC57], 6.1 x 7.8 mm; **118-119.** MNHN, New Caledonia, 600-620 m [BATHUS 4: stn DW891], 4.4 x 5.4 mm.

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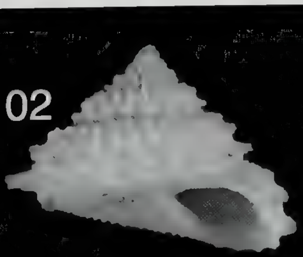

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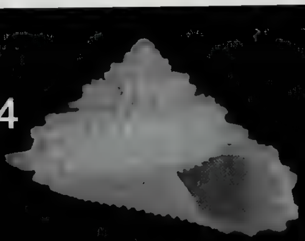

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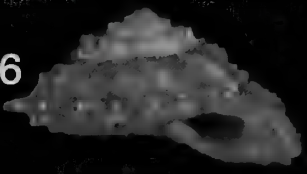

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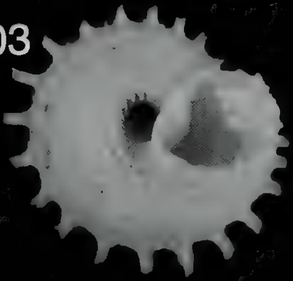

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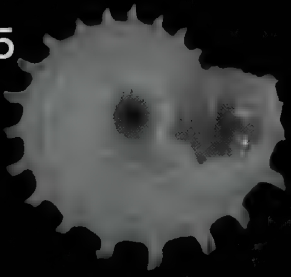

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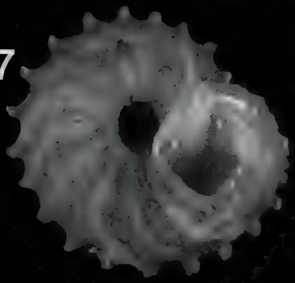

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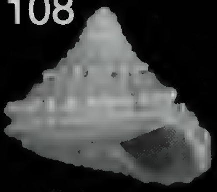

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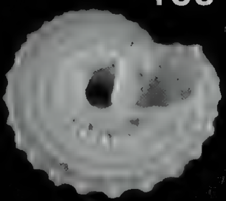

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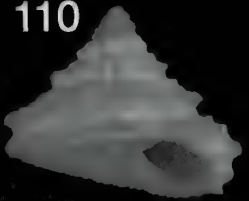

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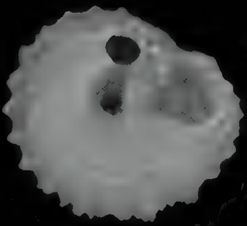

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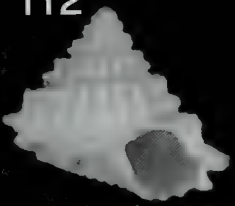

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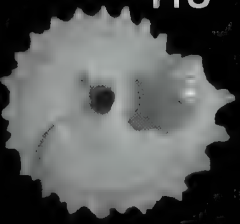

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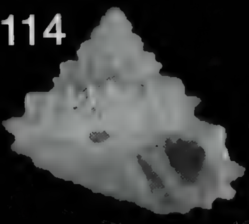

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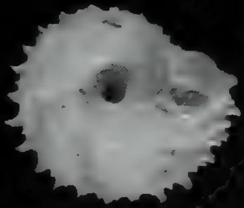

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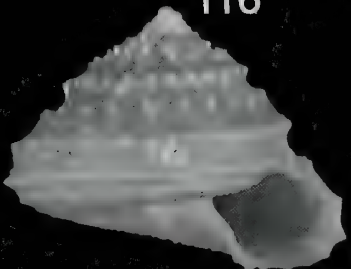

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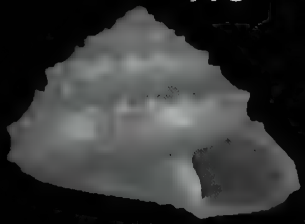

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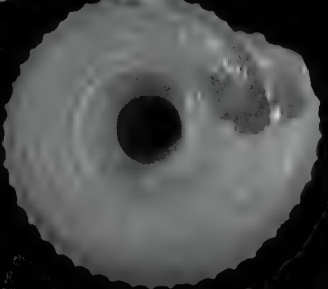

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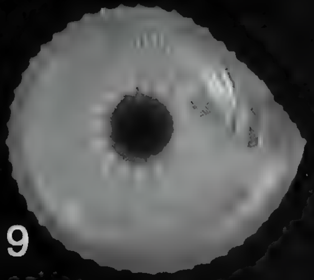


Protoconch of about 400 µm, of 1 whorl, without terminal varix.

Teleoconch up to 6.4 convex whorls, bearing up to 3 spiral granular cords different in size; nodules from cords produced by intersections with axial ribs; axial sculpture on first whorls, reduced to thin, crowded, scaly ribs on last whorls.

Suture visible, impressed, not canaliculated.

First whorl convex, sculptured by about 15 prosocline smooth ribs; interspace between ribs about 1.5x broader than ribs; primary cords P1 and P3 appearing almost immediately, similar in size. On second whorl, P1 and P3 stronger, beads of cords bluntly sharp; interspace between ribs 2x broader than ribs. On third whorl, both cords with pointed beads; beads of P3 oriented at 30°, beads of P1 oriented at 75°; P4 emerging weakly from suture after mid of whorl, granular, much weaker than P1 and P3; P2 absent; axial ribs becoming weaker, interspace between ribs 2.5x broader than ribs. On fourth whorl, P1 becoming obsolete, P3 with strong nodules well spaced; beads of P4 twice more numerous than beads of P3; axial sculpture disappearing except between P3 and P4. On fifth whorl, beads of P3 and P4 scaly; beads of P4 three times more numerous than beads of P3; axial ribs transforming into scaly threads between P3 and P4, and in subsutural area. On last whorls, beads of P4 crowded, axially elongated, 5 times more numerous than beads of P3; subsutural ribs more numerous and scaly, extending near P3 on sixth whorl.

Aperture subquadrangular; outer lip thin, with a median angle and meeting inner lip with a marked angle of about 120°.

Columella more or less straight, oblique, without tooth.

Base moderately convex, with 4 (or sometimes 5) granular spiral cords, innermost cord slightly stronger, bordering umbilicus; distance between cords 2x size of cords; thin, scaly, crowded axial ribs between spiral cords.

Umbilicus wide, diameter ca. 25% to 30% of shell width, deep, funnel shaped, with crowded, thin axial ribs and without spiral cord inside.

Colour of teleoconch beige; protoconch off white.

	TW	H	W	HA	H/W	H/HA
holotype	6.4	10.2	12.9	2.6	0.79	3.92
paratype MNHN 1	5.5	7.6	9.4	2.1	0.81	3.62
paratype MNHN 2	5.3	7.0	8.5	1.9	0.82	3.68

Table 12. - *Calliotropis dicrous* : Shells measurements in mm for types.

Discussion. The combination of a coeloconoidal shape, a spiral cord P2 absent, crowded thin axial threads and two abapical cords very different in size and shape for *Calliotropis dicrous* n. sp. makes it hard to confuse with another *Calliotropis* species. The only one rather close to the new species is *C. boucheti* Poppe, Tagaro & Dekker, 2006 (Figs 208-209) from Philippines, but this similar in size species has a conical shape, a subangulate periphery, an aperture with a rounded outer lip, an existing spiral cord P2 and the two abapical spiral cords of the whorls evenly spaced, similar in size, with similar knobs.

Etymology. Biconical, with two tips (Greek : δικροος) - with reference peculiar shape of the shell that remembers a biconical potery.

Calliotropis scalaris Lee & Wu, 2001
Figs 116-119

Calliotropis scalaris Lee & Wu, 2001: 11, fig. 2. Type locality: South China Sea, Pratas Islands, 400-500 m.

Material examined. Indonesia, Tanimbar Islands. KARUBAR: stn CC56, 08°16'S, 131°59'E, 549-552 m, 1 dd. - Stn CC57, 08°19'S, 131°53'E, 603-620 m, 5 dd. - Stn CP7, 08°38'S, 131°44'E, 477-480 m, 1 dd.

New Caledonia. BATHUS 2: stn CP743, 22°36'S, 166°26'E, 713-950 m, 1 dd. - BATHUS 4: stn DW891, 21°01'S, 164°28'E, 600-620 m, 1 dd.

Distribution. South China Sea, 400-500 m (Lee & Wu, 2001); eastern Indonesia, 480-603 m; New Caledonia, 620-713 m.

Remarks. This species (for which request to borrow types never succeeded) was originally described from South China Sea, with as main distinguishing features (considering mainly pictures of the original description) 3 spiral cords on the whorls (P3 the most prominent, P2 absent) and about 6 spiral cords on the base, the cord around umbilicus stronger. The two New Caledonian specimens are significantly smaller for the same number of whorls, have lower, weaker spiral cords on the base and the walls of umbilicus steeper. Although there is a huge gap between locality type and the two area here recorded, it is hard to discriminate the examined specimens from *C. scalaris*. Only additional material and examination of holotype and paratypes of the reference species (especially regarding ontogeny of spiral cords) could maybe lead to describe a new species or subspecies for the new recorded specimens.

Calliotropis denticulus n. sp.

Figs 248-251, Table 13

Type material. Holotype (7.0 x 9.5 mm) MNHN (9855). Paratypes : 3 MNHN (9856 & 9857).

Type locality. New Caledonia, Norfolk Ridge, BATHUS 3, stn CP844, 23°06'S, 166°46'E, 908 m.

Material examined. New Caledonia. BIOCAL: stn CP55, 23°20'S, 167°30'E, 1160-1175 m, 1 dd juv. - Stn CP63, 24°28'S, 168°08'E, 2160 m, 1 dd. - BIOGEOCAL: stn CP260, 21°00'S, 166°58'E, 1820-1980 m, 1 dd, 1 dd sub, 2 dd juv. - BATHUS 1: stn DE694, 20°36'S 164°58'E, 400-500 m, 2 dd sub. - BATHUS 2/MUSORSTOM 8, 1 dd (paratype 9857), 2 dd sub. - BATHUS 3: stn CP844, 23°06'S, 166°46'E, 908 m, 3 dd (holotype and paratypes 9856).

Distribution. New Caledonia, 500-2160 m.

Diagnosis. A pinkish to greyish white *Calliotropis* species of moderate size, rather depressed, with a coeloconoidal adapical part and a cyrtoconoidal abapical part, up to 4 thin spiral cords on whorls; base with 6 to 8 thin granular spiral cords and rather stronger axial ribs; very wide umbilicus without spiral cord inside.

Description. *Shell* of moderate size for the genus (height up to 7.4, width up to 11.6 mm), broader than high, rather thin, coeloconoidal in upper part, cyrtoconoidal in lower part; spire rather depressed, height 0.8x width, 3.7x to 4.4x aperture height; very broad umbilicus.

Protoconch of from 400 to 450 µm, of 1 whorl, with a rather thin terminal varix.

Teleoconch up to 5 convex whorls, bearing up to 4 thin spiral granular cords, all similar in size except the stronger adapical one; nodules from cords produced by intersections with axial ribs; primary axial sculpture on first whorls, reduced to secondary thin ribs on last whorls.

Suture impressed, not canaliculated.

First whorl convex, sculptured by about 15 thick, prosocline, smooth ribs; interspace between ribs about 2.5x broader than ribs; primary cords P1 and P3 appearing almost immediately, similar in size. On second whorl, P1 and P3 stronger, beads of P3 sharp. On third whorl, both cords with pointed beads; beads of P3 acutely sharp, oriented at 30°, beads of P1 bluntly sharp, almost vertically oriented, stronger than beads of P3 near end of whorl; P2 absent. On fourth whorl, P1 stronger than P3, with less numerous beads (2 beads of P1 for 3 beads of P3); P4 emerging weakly from suture, granular, much weaker than and P3, with less numerous beads (3 beads of P3 for 4 beads of P3); S1 appearing, quickly similar in size to P3; axial ribs becoming obsolete. On last whorl, P1 still strong with sharp beads, other cords thin; number of beads increasing in number from P1 to P4 (ratio of 2 beads of P1 for 3 of S1, 4 of P3 and 5 of P4); secondary thin axial ribs appearing on whole surface.

Aperture subelliptic; outer lip thin, meeting inner lip with an obtuse angle of about 120°.

Columella more or less straight, oblique, without tooth.

Base slightly convex, with 6 to 8 thin granular spiral cords, innermost cord slightly stronger, bordering umbilicus; distance between cords 1.5x size of cords; rather strong axial ribs between spiral cords, distance between ribs similar in size to ribs.

Umbilicus very wide, diameter ca. 35% of shell width, deep, funnel shaped, with same axial ribs as on base, without spiral cord inside.

Colour of teleoconch and protoconch pinkish to greyish white; brown periostracum.

	TW	H	W	HA	H/W	H/HA
holotype	4.7	7.0	9.5	1.6	0.74	4.38
paratype MNHN CP844 1	4.9	5.4	7.7	1.3	0.70	4.15
paratype MNHN CP844 1	5.0	6.1	7.4	1.6	0.82	3.81
paratype MNHN BATHUS2	5.0	7.4	11.6	2.0	0.64	3.70

Table 13. - *Calliotropis denticulus* : Shells measurements in mm for types.

Discussion. *Calliotropis denticulus* n. sp. is rather close to *C. reticulina* (Dall, 1895) from off Hawai and Japan, but this species has a greater H/H ratio, beads of P3 and P4 much broader and less numerous and a less wide umbilicus.

The new species is also close to *C. abyssicola* Rehder & Ladd, 1973 from Central Pacific, but this species is different for the same reasons as them relative to *C. reticulina*; moreover, this species has a canaliculated suture.

C. denticulus n. sp. remembers *C. keras* n. sp. (Figs 212-213) from Fiji and Tonga, but this similar in size species has a more depressed spire, thicker cors on the whorls, less numerous and different in shape spiral cords on the base and a narrower umbilicus.

Etymology. Lace (Latin), used as a noun in apposition - with reference to the delicate scultpture of the shell.

Calliotropis delli Marshall, 1979
Figs 58-61

Calliotropis delli Marshall, 1979: 528-529, figs. 3D-G, tab. 3. Type locality: Kermadec Islands (Raoul Is.), 29°14.7'S, 177°49.4'W, 146-165 m.
Other references :
Calliotropis delli - Poppe, Tagaro & Dekker, 2006: 58, pl. 22, fig. 1.

Material examined. New Caledonia. BIOCAL: stn DW08, 20°34'S, 166°54'E, 435 m, 3 dd, 1 dd juv. - Stn DW38, 23°00'S, 167°15'E, 360 m, 1 dd, 1 dd juv. - Stn DW44, 22°47'S, 167°14'E, 440-450 m, 1 dd. - Stn DW46, 22°53'S, 167°17'E, 570-610 m, 20 dd & 10 dd juv. - Stn DW48, 23°00'S, 167°29'E, 775 m, 2 dd. - Stn DW66, 24°55'S, 168°22'E, 505-515 m, 2 dd. - MUSORSTOM 4: stn DW156, 18°54'S, 163°19'E, 525 m, 2 dd. - Stn DW197, 18°51'S, 163°21'E, 550 m, 1 lv. - Stn DW220, 22°58.50', 167°38.30'E, 1 dd. - Stn DW223, 18°S, 163°E, 545-560 m, 1 dd. - CHALCAL 2: stn DW76, 23°40'S, 167°45'E, 470 m, 1 dd juv. - Stn DW76, 23°40'S, 167°45'E, 470 m, 10 dd, 2 dd juv. - CALSUB: stn PL15, 20°37'S, 166°56'E, 538 m, 1 dd. - BERYX 11: stn DW10, 24°53'S, 168°21'E, 565-600 m, 1 dd. - SMIB 8: stn DW148, 24°56'S, 168°21'E, 510 m, 1 dd. - Stn DW166, 23°38'S, 167°43'E, 433-450 m, 11 dd, 5 dd sub, 3 dd juv. - Stn DW167, 23°38'S 167°43'E, 430-452 m, 1 lv sub, 6 lv juv. - Stn DW169, 23°37'S, 167°42'E, 447-450 m, 2 dd, 1 dd juv. - Stn DW193-196, 22°52'S-23°S, 167°20'-168°22'E, 491-558 m, 6 dd. - BATHUS 2: stn DW719, 22°48'S, 167°16'E, 444-445 m, 3 dd, 2 dd sub. - Stn DW720, 22°52'S 167°16'E, 530-541 m, 2 dd, 1 dd juv. - Stn DW721, 22°54'S, 167°17'E, 525-547 m, 5 lv. - Stn DW732, 22°50'S 166°25'E, 236-264 m, 1 dd. - BATHUS 3: stn DW809, 23°39'S, 167°59'E, 650-730 m, 1 dd. - BATHUS 4: stn DW914, 18°49'S, 163°15'E, 600-616 m, 2 dd, 2 dd sub, 8 dd juv. - Stn DW919, 18°50'S, 163°17'E, 610-660 m, 5 dd. - Stn DW927, 18°56'S, 163°22'E, 444-452 m, 11 lv. - Stn DW931, 18°55'S, 163°24'E, 360-377 m, 1 lv. - Stn DW918, 18°49'S, 163°16'E, 613-647 m, 1 dd. - Stn DW942, 19°04'S, 163°27'E, 264-270 m, 1 dd, 1 dd sub.
Chesterfield. MUSORSTOM 5: stn 362, 19°53'S 158°40'E, 410 m, 2 dd. - Stn 378, 19°54'S 158°38'E, 355 m, 1 dd.
Loyalty ridge. BIOGEOCAL: stn DW307, 20°35'S, 166°55'E, 470-480 m, 1 dd sub. **Loyalty basin.** MUSORSTOM 6: stn DW410, 20°38'S, 167°07'E, 490 m, 1 dd.
Fiji. MUSORSTOM 10: stn DW1390, 18°18.6'S, 178°05.1'E, 234-361 m, 1 dd juv. - BORDAU 1: stn DW1488, 19°01'S, 178°25'W, 500-516 m, 3 dd.
South-western Pacific, Wallis Island. MUSORSTOM 7: stn DW601, 13°19'S, 176°17'W, 350 m, 10 dd, 2 dd juv.
Tonga. BORDAU 2: stn DW 1548, 20°38'S, 175°03'W, 476-478 m, 2 dd.

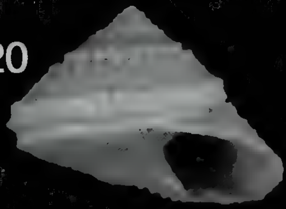
Distribution. South-western Pacific (from Chesterfield to Tonga), 350-490 m (range computed using also the material examined by Marshall, 1979).

Remarks. Following the original description, the main distinguishing features of *C. delli* Marshall, 1979 are a very small size (height about 3.5 mm), a moderately elevated spire with up to 6.5 whorls, 2 nodular, similar in size spiral cords on whorls (more explicitly : P1 at adapical third, separated from the suture by a subsutural ramp, P2 absent and P3 nearly peripheral at abapical quarter), axial ribs on the whole surface (primary axial ribs widely spaced, narrower secondary ribs in the subsutural ramp), 4 or 5 granular spiral cords on the base, a deep, rather narrow umbilicus with one thin beaded spiral cord inside, an aperture inclined backward.

Figures 120-137. Scale bar = 5 mm.

120-123. *Calliotropis oros* n. sp., Fiji.
120-121. Holotype MNHN (9862), 441-443 m [MUSORSTOM 10, stn DW1382], 4.2 x 6.1 mm; **122-123.** Paratype MNHN (9863), 441-443 m [MUSORSTOM 10, stn DW1382], 5.4 x 6.2 mm.
124-129. *C. oros marquisensis* n. ssp., Marquesas Islands.
124-125. Holotype MNHN (9875), 500-525 m [MUSORSTOM 9, stn DW1207], 6.4 x 9.4 mm; **126-127.** Paratype MNHN (9876), 500-525 m [MUSORSTOM 9, stn DW1207], 5.8 x 9.0 mm; **128-129.** MNHN, 660-680 m [MUSORSTOM 9, stn DW1272], 6.4 x 10.1 mm.
130-133. *C. zone* n. sp., New Caledonia.
130-131. Holotype MNHN (9866), 39 m [PALEO-SURPRISE: stn DW1396], 4.8 x 6.1 mm; **132-133.** Paratype MNHN (9867), 300 m [MUSORSTOM 4: stn DW227], 4.3 x 5.8 mm.
134-137. *C. hysterea* n. sp.
134-135. Holotype MNHN (9864), 900-980 m [BIOCAL, stn DW80], 5.8 x 7.6 mm; **136-137.** MNHN, New Caledonia, 1060-1130 m [HALIPRO 2, stn BT102], 5.2 x 7.0 mm.

120



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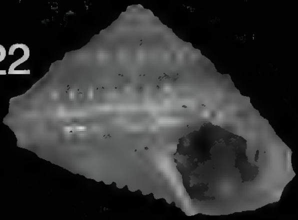

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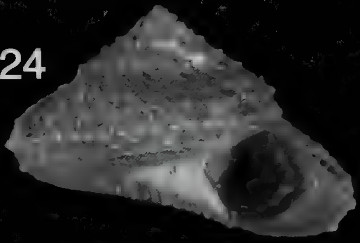

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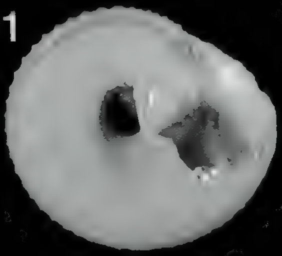

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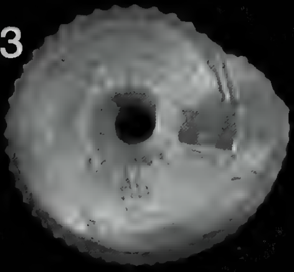

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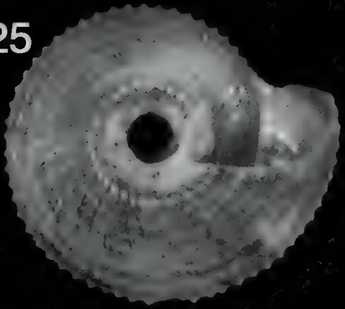

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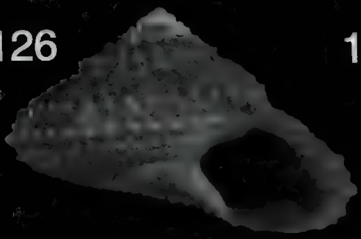

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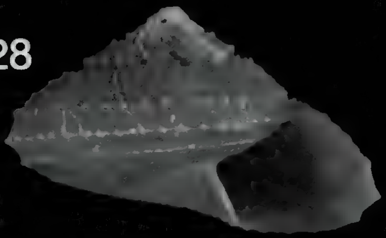

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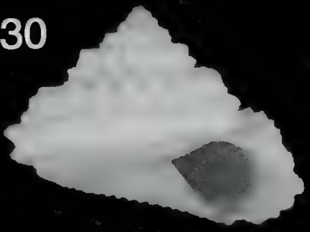

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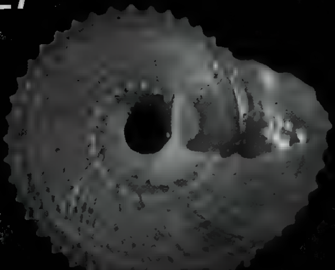

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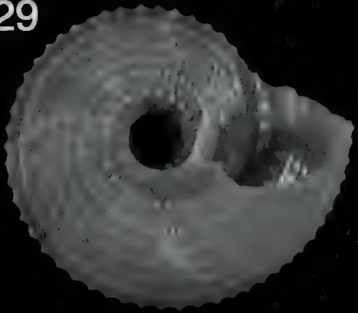

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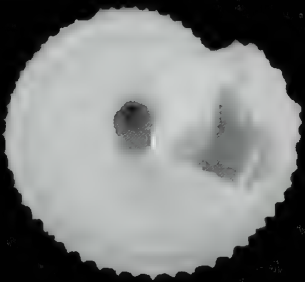

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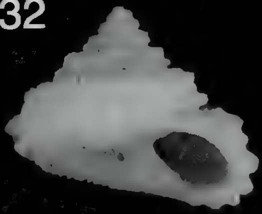

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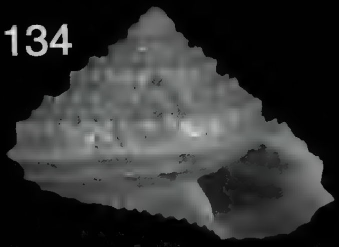

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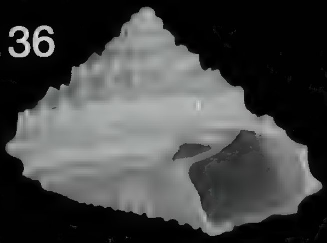

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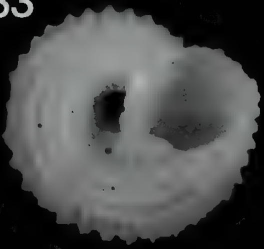

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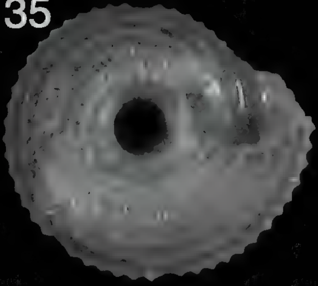

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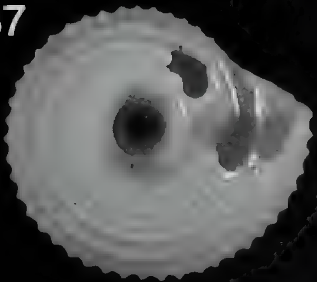

I don't know any other reference to this species and there is no indication about the variability of the shell. Specimens studied here match the original description, except that P3 is not so low on the whorls (at abapical third instead quarter) and a P4 is clearly visible on last whorl (the original description doesn't state explicitly the presence of P4, but use a "3d spiral" as reference of extension of the axial ribs). Also some specimens have only 3 spiral cords on the base (e.g. specimens BATHUS 4, stn DW914, stn DW918 and stn DW927), but maybe the original description took into account of basal cords the last spiral cord P4 of the last whorl. Anyway, informations about animal are lacking and the small differences regarding the shells seem not enough to justify a categorisation of these specimens into a new species.

Calliotropis pyramoeides n. sp.

Figs 112-115, Table 14

Type material. Holotype (3.6 x 3.9 mm) MNHN (9858). Paratype MNHN (9859).

Type locality. Loyalty ridge, MUSORSTOM 6, stn DW442, 20°54'S, 167°17'E, 200 m.

Material examined. Loyalty ridge. MUSORSTOM 6: stn DW442, 20°54'S, 167°17'E, 200 m, 1 lv (holotype). - Stn DW461, 21°06'S, 167°26'E, 240 m, 1 dd (paratype).
Southern New Caledonia. VAUBAN: stn 40, 22°30'S, 166°24'E, 250-350 m, 1 dd, 2 dd juv.

Distribution. South-western Pacific (New Caledonia area), alive at 200 m, shells in 250-350 m.

Diagnosis. A small *Calliotropis* species with a moderately elevated, conical spire, white, with 2 nodular spiral cords on spire whorls, both with sharp nodules, the abapical cord the strongest; one additional, sharp granular spiral cord on last whorl; base with 3 granular spiral cords; umbilicus with 2 spiral cords inside.

Description. *Shell* of small size for the genus (height up to 3.6 mm, width up to 3.9 mm), more or less as high as broad, conical; spire moderately elevated, height 0.9x to 1.0x width, 4.4x to 4.5x aperture height; moderately broad umbilicus.
Protoconch of ca 200 µm, of 1 whorl, glassy, bulbous, without discernable terminal varix.
Teleoconch up to 5.7 convex whorls, bearing 3 spiral granular cords; nodules from cords produced by intersections with axial ribs still visible on last whorls. Suture impressed, not canaliculated.
First whorl convex, sculptured by 15 slightly prosocline smooth ribs, interspace between ribs at least 3x broader than ribs; primary spiral cords P2 appearing at end of whorl, P1 half a whorl later, both granular; P1 weaker than P2. On second whorl, cords similar in size, with granules becoming slightly sharp. On third whorl, beads of both cords more strongly sharp; beads of P1 oriented at 45°, beads of P2 horizontally oriented; P1 making keel with a shoulder at first quarter of whorl, subsutural ramp almost horizontal; P3 partially emerging from suture, granular, weaker than other cords; axial ribs very prominent. On fourth whorl, spines of P1 and P2 scaly, P2 stronger than P1. On last whorl, P3 peripheral, weaker than other cords, with more closely packed granules; axial ribs still visible, connecting spines of P1 and P2.
Aperture quadrangular; outer lip rather thin, meeting inner lip with an obtuse angle.
Columella straight, oblique, without tooth.
Base weakly convex, with 3 thick granular spiral cords; distance between cords smaller than cords.
Umbilicus moderately broad, diameter ca. 25% of shell width, deep, funnel shaped; low, thick axial ribs and 2 thick granular spiral cords within.
Colour of teleoconch and protoconch white.

	TW	H	W	HA	H/W	H/HA
holotype	5.7	3.6	3.9	0.8	0.92	4.50
paratype MNHN	5.6	3.6	3.9	0.8	0.92	4.50
specimen NC	5.3	3.1	3.1	0.7	1.00	4.43

Table 14. - *Calliotropis pyramoeides* : Shells measurements in mm for types and specimen.

Discussion. *Calliotropis pyramoeides* n. sp. is close to *C. grata* Thiele, 1925 from eastern Africa, but this similar in size species has a cyrtoconoidal shape, P2 closer to P3 than to P1, 4 spiral cords on the base and no visible spiral cords inside the umbilicus; the beads of P2 are smaller than those of the new species and are only scaly, not sharp.
The new species may also be compared to *C. muricata* (Schepman, 1908) (Figs 70-71) from Indonesia, but this species has a cyrtoconoidal shape, 4 spiral cords on last whorls with not spiny beads and two columellar denticles.
C. pyramoeides n. sp. also weakly remembers *C. malapascuensis* Poppe, Tagaro & Dekker, 2006 from Philippines, but this species has nodules of P1 and P2 that are much stronger, of the same size and not spiny nor scaly; it has only one spiral cord inside the umbilicus.

Etymology. Pyramidal (Greek : πυραμοειδης) - with reference to the shape of the spire of the shell.

Calliotropis coopertorium n. sp.
Figs 108-111, Table 15

Type material. Holotype (2.8 x 3.3 mm) MNHN (9860). Paratypes: 7 MNHN (9861), 2 NMNZ (M.273552), 1 coll. C.Vilvens.

Type locality. Fiji, MUSORSTOM 10, stn DW1365, 18°12.7'S, 178°32.4'E, 295-302 m.

Material examined. Fiji. MUSORSTOM 10: stn DW1365, 18°12.7'S, 178°32.4'E, 295-302 m, 11 dd (holotype and paratypes). - Stn DW1370, 18°18.7'S, 178°09.1'E, 497-504 m, 2 lv. - Stn DW1390, 18°18.6'S, 178°05.1'E, 234-361 m, 12 lv.
Vanuatu. MUSORSTOM 8: stn CP1101, 15°04'S, 167°08'E, 205-210 m, 3 dd.

Distribution. South-western Pacific (from Vanuatu to Fiji), alive in 361-497 m, shells in 210-497 m.

Diagnosis. A small *Calliotropis* species with a moderately elevated, coeloconoidal spire, white or light brown, with 2 granular spiral cords on spire whorls, both close to suture, the abapical cord the strongest with sharp granules; one additional, granular spiral cord on last whorl; base with 3 granular spiral cords; very large umbilicus with 3 spiral cords inside.

Description. *Shell* of small size for the genus (height up to 2.9 mm, width up to 3.5 mm), broader than high, rather thin, coeloconoidal; spire moderately elevated, height 0.8x to 0.9x width, 3.0x to 4.1x aperture height; broad umbilicus.
Protoconch of about 150 µm, of 1 whorl, bulbous, with a weak thin terminal varix.
Teleoconch up to 5.5 weakly flat to slightly concave whorls, bearing 3 spiral granular cords; nodules from cords produced by intersections with axial ribs that are nearly obsolete on last whorls.
Suture impressed, not canaliculated.
First whorl convex, sculptured by 20 slightly prosocline smooth ribs, interspace between ribs about 2x broader than ribs; primary spiral cords P3 appearing at first half and P1 at end of whorl, granular; P1 weaker than P3. On second whorl, P3 the strongest, with granules becoming slightly sharp; axial ribs broader but weaker. On third whorl, beads of P3 more strongly sharp, horizontally oriented; P4 emerging from suture, granular, similar in strength to P1; P2 absent; axial ribs becoming obsolete. On fourth whorl, P1 stronger than P4, still much weaker than P3; beads of P1 slightly sharp, adapically oriented. On last whorls, P3 the strongest, P1 and P4 more or less similar in size, granules of P4 slightly closer to each other; S1 may appear on some specimens, quickly similar in size to P1 or even thicker.
Aperture subelliptic, oblique, slightly declivous; outer lip rather thick, meeting inner lip with an obtuse, poorly marked, angle.
Columella curved in the middle, slightly reflected into umbilicus, with one weak basal tooth, only obvious in large specimens .
Base moderately convex, with 3 granular spiral cords, innermost cord stronger and bordering umbilicus; distance between cords similar in size to cords; more or less visible axial ribs between cords, connecting beads of spiral cords.
Umbilicus broad, diameter ca. 30% of shell width, deep, funnel shaped, with gently sloping walls, weak axial ribs and 3 granular spiral cords within.
Colour of teleoconch white, sometimes with brownish flames; protoconch white.

	TW	H	W	HA	H/W	H/HA
holotype	5.5	2.8	3.3	0.7	0.85	4.00
paratype MNHN 1	5.1	2.8	3.3	0.8	0.85	3.50
paratype MNHN 2	5.4	2.9	3.4	0.8	0.85	3.63
paratype MNHN 3	5.4	2.8	3.2	0.9	0.88	3.11
paratype MNHN 4	5.2	2.7	3.2	0.9	0.84	3.00
paratype MNHN 6	5.2	2.5	3.2	0.8	0.78	3.13
paratype MNHN 8	5.1	2.4	3.2	0.7	0.75	3.43
paratype MNHN 9	4.8	2.2	2.6	0.7	0.85	3.14
paratype NMNZ 1	5.1	2.8	3.1	0.8	0.90	3.50
paratype NMNZ 2	5.1	2.3	2.9	0.7	0.79	3.29
paratype CV	5.1	2.4	2.9	0.7	0.83	3.43
specimen Vanuatu	5.5	2.9	3.5	0.7	0.83	4.14

Table 15. - *Calliotropis coopertorium* : Shells measurements in mm for types and specimen.

Discussion. The combination of a small size, a coelonoidal spire and a missing P2 makes *Calliotropis coopertorium* n. sp. hard to confuse with another *Calliotropis* species, except maybe with *C. echidna* Jansen, 1994 (Figs 68-69) from eastern Australia, but this species has a spire with a first part coeloconoidal and second part cyrtoconoidal, and 4 thick spiny spiral cords (P2 is present).

Etymology. Cover (Latin : coopertorium, -i), used as a noun in apposition - after the shape of the spire of the shell remembering the cover of an arabian pan.

Calliotropis oros n. sp.

Figs 120-123, Table 16

Type material. Holotype (4.2 x 6.1 mm) MNHN (9862). Paratypes: 4 MNHN (9863).

Type locality. Fiji, MUSORSTOM 10, DW1382, 18°19.25'S, 177°51.7'E, 441-443 m.

Material examined. Fiji. MUSORSTOM 10: stn CP1376, 18°18.7'S, 178°09.1'E, 497-504 m, 1 dd. - Stn DW1382, 18°19.25'S, 177°51.7'E, 441-443 m, 6 dd, 1 dd juv (with holotype and paratypes). - BORDAU 1: stn CP1396, 16°39'S, 179°57'W, 591-596 m, 12 lv. - Stn CP1407, 16°40'S, 179°39'W, 499-527 m, 14 lv, 30 dd sub.
New Caledonia. BATHUS 4: CP948, 533-610 m, 20°33'S, 164°57'E, 3 dd.

Distribution. South-western Pacific (from New Caledonia to Fiji), alive in 527-591 m, shells in 443-591 m.

Diagnosis. A small *Calliotropis* species with a moderately elevated, conical to slightly cyrtoconoidal spire, white or brownish white, with 2 main granular spiral cords on spire whorls, the adapical cord close to suture and the other at third quarter of the height of whorl; additional, weak, granular spiral cords between the two main cords and an additional, peripheral, granular spiral cord on last whorl; base with about 7 granular spiral cords; rather broad umbilicus with one weak spiral cord inside.

Description. *Shell* of small size for the genus (height up to 5.4 mm, width up to 6.2 mm), broader than high, rather thin, conical to slightly cyrtoconoidal; spire moderately elevated, height 0.7x to 0.9x width, 3.6x to 4.7x aperture height; rather broad umbilicus.
Protoconch of about 250 µm, of 1 whorl, glassy, bulbous, with a very weak thin terminal varix.
Teleoconch up to 4.9 weakly flat to slightly convex whorls, bearing 6 spiral granular cords different in size; nodules from cords produced by intersections with axial ribs that are weaker but still visible on last whorls.
Suture impressed, weakly canaliculated.
First whorl convex, sculptured by 14 or 15 orthocline smooth, rather thick ribs, interspace between ribs from 1.5x to 2x broader than ribs; primary spiral cords P1 and P3 appearing almost immediately, granular, similar in size. On second whorl, P3 stronger than P1; axial ribs broader, interspace between ribs 2x broader than ribs. On third whorl, beads of cords bluntly sharp; P4 emerging from suture, granular, similar in size to P3; P2 absent; axial ribs becoming obsolete in central area of whorl. At begin of fourth whorl, up to 3 tertiary cords appearing, very thin, much weaker than P1 and P3, uppermost one granular. On last whorl, P4 peripheral, almost so strong as P3, giving a bicarinate shape to the whorl; tertiary cords possibly granular on large specimens.
Aperture subcircular, possibly slightly declivous (holotype); outer lip thin, meeting inner lip with a distinct angle.
Columella curved in the middle, slightly reflected into umbilicus, without tooth.
Base slightly convex, with 7 or 8 granular spiral cords; innermost cord stronger, with sharp granules, bordering umbilicus; outermost cord isolated, stronger than other cords except innermost cord; distance between inner cords smaller than size of cords, between outer cords similar in size to cords; axial ribs connecting beads of spiral cords.
Umbilicus broad, diameter ca. 25% of shell width, deep, funnel shaped, with rather steep sloping walls, axial ribs and one thin, granular spiral cord within.
Colour of teleoconch nacreous brownish white; protoconch translucent.

Figures 138-155. Scale bar = 5 mm.

138-155. *Calliotropis eucheloides* Marshall, 1979, MNHN.
- **138-145.** Typical form with granular basal cords.
  - **138-141.** New Caledonia, 440 m [BIOCAL, stn DW77]; **138-139.** 7.9 x 12.3 mm; **140-141.** 8.6 x 11.3 m. **142-143.** Tonga Islands, 407-443 m [BORDAU 2, stn DW1631], 8.2 x 12.1 mm. **144-145.** Solomon Islands, 200-303 m [SALOMON 1, stn DW1769], 7.5 x 10.7 mm.
- **146-147.** Intermediate form with weakly granular basal cords, New Caledonia, 525 m [MUSORSTOM 4, stn DW162], 7.2 x 10.4 mm.
- **148-151.** Intermediate form with smooth basal cords.
  - **148-149.** New Caledonia, 405 m [SMIB 3, stn DW29], 6.0 x 8.4 m; **150-151.** New Caledonia, 343-400 m [NORFOLK 1, stn DW1737], 7.2 x 8.9 mm.
- **152-155.** Smooth base form, New Caledonia, 444-452 m [BATHUS 4: stn DW927].
  - **152-153.** 7.3 x 9.3 mm; **154-155.** 7.2 x 10.4 mm.

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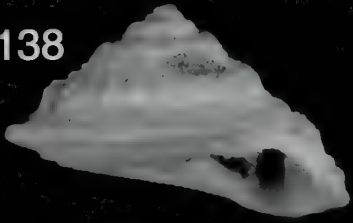
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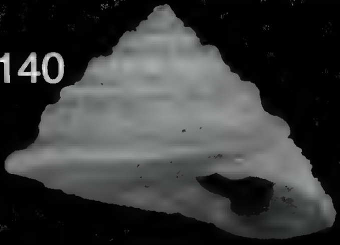
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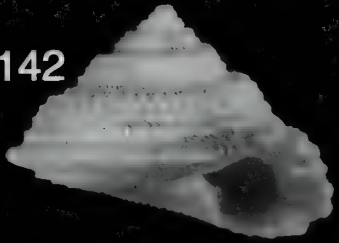
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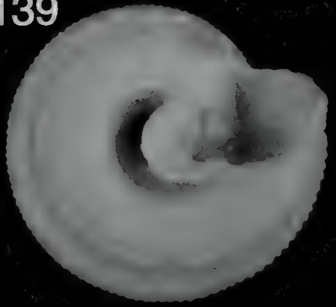
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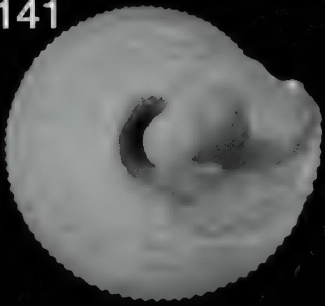
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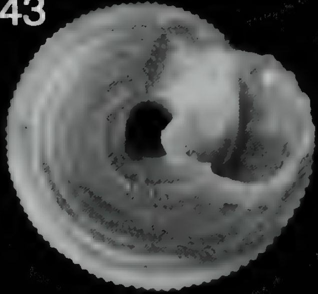
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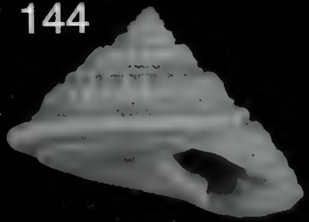
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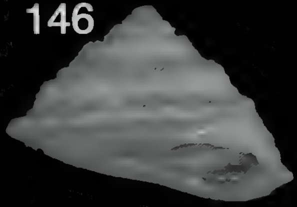
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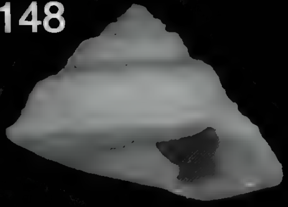
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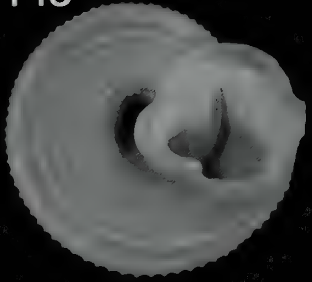
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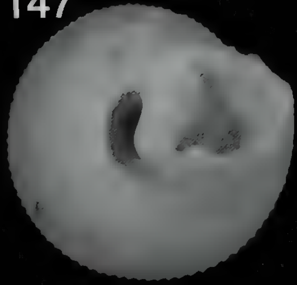
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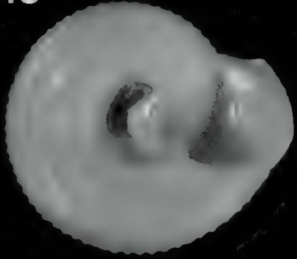
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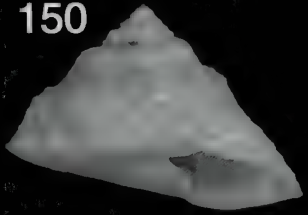
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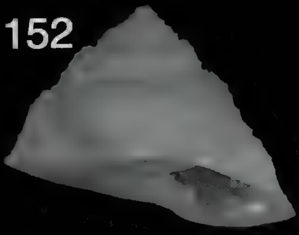
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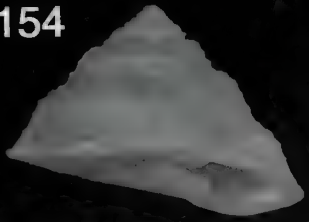
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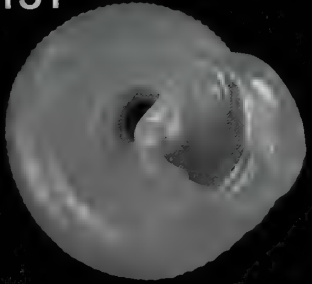
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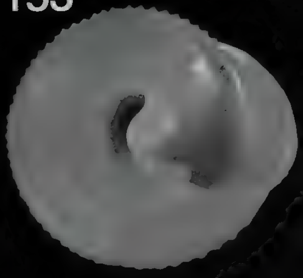
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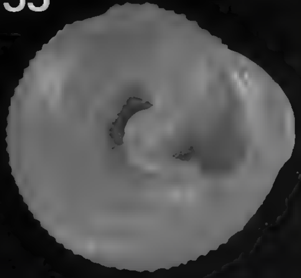


	TW	H	W	HA	H/W	H/HA
Holotype	4.7	4.2	6.1	0.9	0.69	4.67
paratype MNHN 1	4.9	5.4	6.2	1.4	0.87	3.86
paratype MNHN 2	4.7	4.5	5.4	1.1	0.83	4.09
paratype MNHN 3	4.4	4.0	5.6	1.1	0.71	3.64
paratype MNHN 4	4.5	4.2	5.4	1.0	0.78	4.20

Table 16. - *Calliotropis oros* : Shells measurements in mm for types.

Discussion. The combination of a small size, a nearly conical spire and a large area between P1 and P3 makes *Calliotropis oros* n. sp. hard to confuse with another *Calliotropis* species, except maybe with *C. scalaris* Lee & Wu, 2001 (Figs 116-119) from South China Sea and Indonesia, but this slightly bigger species has a cyrtonoidal spire with more convex whorls, a P3 not so close to P4 (at second third of whorl), no tertiary cords, less spiral cords on the base and no spiral cord inside the umbilicus.

Regarding the number of spiral cords on the whorls and on the base, the new species may also be compared to *C. abyssicola* Rehder & Ladd, 1973 from central Pacific, but this bigger species has a cyrtonoidal spire with more convex whorls, a intermediate primary cord nearly median on the whorls and no spiral cord inside the umbilicus.

Regarding the conical shape of the shell, *C. oros* n. sp. may remember *C. reticulina* (Dall, 1895) from Hawaii and Japan, but in this slightly larger species, P2 is not lacking and there is no spiral cord inside the umbilicus.

The new species may also remember *C. francocacii* Poppe, Tagaro & Dekker, 2006 from Philippines, but this similar in size species has a more elevated spire, a nearly median intermediate primary cord, beads of the three primary cords bigger and less numerous, no tertiary spiral cords between P3 and P4 and only 4 spiral cords on the base.

Etymology. Mountain (Greek : opoς), used as a noun in apposition - with reference of the more or less conical shape of the shell.

Calliotropis hysterea n. sp.

Figs 134-137

Type material. Holotype (5.8 x 7.6 mm) MNHN (9864). Paratype (5.5 x 7.0) MNHN (9865).

Type locality. New Caledonia, BIOCAL, stn DW80, 20°32'S, 166°48'E, 900-980 m.

Material examined. New Caledonia. BIOCAL: stn DW80, 20°32'S, 166°48'E, 900-980 m, 3 dd, 1 dd sub, 3 dd juv (holotype and paratype). - BATHUS 1: stn CP651, 21°42'S, 166°40'E, 1080-1180 m, 1 dd sub, 3 dd juv. - HALIPRO 2: stn BT102, 24°31'S, 161°52'E, 1060-1130 m, 1 dd.

Chesterfield. MUSORSTOM 5: stn 321, 21°20'S 158°02'E, 1000 m, 1 dd, 1 dd juv.

Distribution. South-western Pacific (from Chesterfield to New Caledonia), 980-1080 m.

Diagnosis. A rather small *Calliotropis* species with a moderately elevated, about conical spire, broad protoconch and convex whorls, white or brownish white, with 2 main granular spiral cords on spire whorls, up to 4 granular spiral cords on last whorl, the abapical main cord peripheral; base with 6 granular spiral cords; broad umbilicus without spiral cord inside.

Description. *Shell* of moderate size for the genus (height up to 5.8 mm, width up to 7.6 mm), broader than high, rather thin, conical to slightly cyrtoconoidal; spire moderately elevated, height 0.8x width, 3.9x to 4.6x aperture height; broad umbilicus.

Protoconch from 360 to 400 µm, of at least 1 whorl, glassy, dome shaped, without clearly visible terminal varix.

Teleoconch up to 5 convex whorls, bearing up to 4 spiral granular cords; nodules from cords produced by intersections with axial ribs; axial sculpture still visible, but weak, on last whorls.

Suture impressed, canaliculated except on last whorls.

First whorl convex, sculptured by 12 to 14, orthocline, smooth, moderately thick ribs; interspace between ribs 2.5x to 3x broader than ribs; primary spiral cords P1 appearing almost immediately and P2 half a whorl later, similar in size. On second whorl, P2 stronger than P1; axial ribs slightly broader, interspace between ribs 2.5x broader than ribs. On third whorl, P1 and P2 stronger; beads of cords bluntly sharp; P3 emerging weakly from suture at end of whorl, granular, smaller than P3. On fourth whorl, P1 and P2 much stronger and axial threads weaker than on preceding whorl; sharp beads of P1 oriented at about 75°, sharp beads of P2 slightly thicker and oriented at 45°, beads of P3 weaker, more numerous and more closely packed than those of P1 and P2. On last whorl, S1 appearing on most specimens, much weaker than P1 and P2, nearly smooth for half a whorl, weakly granular at end of whorl; P3 weaker then P2, peripheral.

Aperture subcircular to subelliptic; outer lip thin, meeting inner lip with an obtuse, marked angle.
Columella more or less straight, oblique, without tooth.
Base convex, with 6 rather granular spiral cords, similar in size except the third (counting from the outermost) thinner and the innermost slightly stronger, bordering umbilicus; distance between cords from 1x to 1.5x size of cords; axial ribs between spiral cords, connecting beads of innermost cords.
Umbilicus broad, diameter ca. 30% of shell width, deep, funnel shaped, with rather strong axial ribs and without spiral cord inside.
Colour of teleoconch and protoconch nacreous white.

Discussion. *Calliotropis hysterea* n. sp. may remember juvenile specimens of *C. derbiosa* Vilvens, 2004 from south-western Pacific, but this species has a more elevated spire, its beads of the spiral cords of the whorls and of the base in this species are much more rounded and more closely packed, the axial ribs are stronger and much more close.
The new species is rather close to *C. calatha* (Dall, 1927) from western Atlantic, but this bigger species, of which the extreme variability was pointed out by Quinn (1979), has a spiral cord P2 with more numerous, more closely packed, only weakly sharp beads, and only 3 or 4 spiral cords on the base.

Etymology. Late (Greek : υστερεος) - with reference to the spiral cord S1 appearing late.

Calliotropis zone n. sp.

Figs 130-133, Table 17

Type material. Holotype (4.8 x 6.1 mm) MNHN (9866). Paratypes: 2 MNHN (9867).

Type locality. New Caledonia, PALEO-SURPRISE, stn DW1396, 18°20.7'S, 163°04.7'E, 39 m.

Material examined. New Caledonia. MUSORSTOM 4: stn DW227, 22°46'S, 167°20'E, 300 m, 2 dd (paratypes). - MUSORSTOM 6: stn DW459, 21°01'S, 167°31'E, 425 m, 2 lv, 3 dd juv. - SMIB 8: stn DW169, 23°37'S, 167°42'E, 447-450 m, 1 dd. - BATHUS 1: stn DW688, 20°33'S, 165°00'E, 270-282 m, 1 dd, 1 dd juv. - BATHUS 2: stn DW717, 22°44'S, 167°17'E, 350-393 m, 4 dd, 10 dd juv. - Stn DW724, 22°48'S, 167°26'E, 344-358 m, 3 dd. - Stn DW749, 22°33'S, 166°26'E, 233-258 m, 2 dd. - BATHUS 3: stn DW838, 23°01'S, 166°56'E, 400-402 m, 3 dd. - PALEO-SURPRISE: stn DW1396, 18°20.7'S, 163°04.7'E, 39 m, 1 dd (holotype).
Fidji. MUSORSTOM 10: stn CP1325, 17°16.4'S, 177°49.8'E, 282-322 m, 1 dd juv. - Stn CP1384, 18°18.5'S, 178°05.8'E, 260-305 m, 1 dd. - Stn DW1388, 18°18.5'S, 178°01.8'E, 313-446 m, 4 dd & 1 dd juv. - BORDAU 1: stn CP1421, 17°08'S, 178°59'W, 403-406 m, 1 dd.
Taiwan. TAIWAN 2000: stn DW34, 22°01.9'S, 120°36.4'E, 246 m, 1 dd.

Distribution. South-western Pacific (from New Caledonia to Fiji), alive at 425 m, shells in 305-403 m; Taiwan, 246 m.

Diagnosis. A small *Calliotropis* species with a moderately elevated, a cyrtoconoidal spire, white or brownish white, with 2 main granular spiral cords on spire whorls, up to 5 granular spiral cords on keeled last whorl, the abapical main cord peripheral; base with 3 granular spiral cords; broad umbilicus with 3 spiral cords inside.

Description. *Shell* of small size for the genus (height up to 4.8 mm, width up to 6.1 mm), broader than high, moderately thick, slightly cyrtoconoidal; spire moderately elevated, height 0.7x to 0.8x width, 4.4x to 5.4x aperture height; broad umbilicus.
Protoconch of about 150 μm, of 1 whorl, bulbous, without clearly visible terminal varix.
Teleoconch up to 5.7 convex whorls, bearing 6 spiral granular cords different in size; nodules from cords produced by intersections with axial ribs; axial sculpture still visible on last whorls.
Suture impressed, weakly canaliculated.
First whorl convex, sculptured by 12 or 14 weakly prosocline smooth, moderately thick ribs, interspace between ribs about 2x broader than ribs; primary spiral cords P1 and P3 appearing at end of whorl, poorly distinct, similar in size. On second whorl, P3 stronger than P1, P1 still rather indistinct; axial ribs slightly broader, interspace between ribs 2x broader than ribs. On third whorl, P1 and P3 stronger; beads of cords bluntly sharp; P2 absent. On fourth whorl, P1 and P3 much stronger, with very different shape : nodules of P3 sharp, sometimes scaly, orizontally oriented, and nodules of P1 thicker, bluntly sharp, axially elongated, oriented at 45°; thin axial threads appearing on the subsutural ramp; P4 emerging weakly from suture at end of whorl, granular, smaller than P3. On fifth whorl, S1 appearing, granular, much weaker than P1 and P3; P1 dividing in two cords half a whorl later; sharp beads of P3 more numerous and more closely packed than nodules of P1. On last whorl, P4 only slightly weaker then P3, giving a bicarinate shape to the whorl.
Aperture subelliptic, possibly slightly declivous (paratypes); outer lip rather thick, meeting inner lip with an obtuse, poorly marked angle.
Columella curved in the middle, slightly reflected into umbilicus, with a weak basal tooth in largest specimens (paratypes).
Base moderately convex, with 3 rather thick granular spiral cords; innermost cord slightly stronger; distance between cords similar in size to cords; axial ribs between spiral cords, connecting beads of cords.
Umbilicus broad, diameter ca. 30% of shell width, deep, funnel shaped, with gently sloping walls, rather

thick axial ribs and 3, sometimes 4, granular spiral cords within.

Colour of teleoconch and protoconch brownish white.

	TW	H	W	HA	H/W	H/HA
holotype	5.5	4.8	6.1	0.9	0.79	5.33
paratype MNHN 1	5.7	4.3	5.8	0.8	0.74	5.38
paratype MNHN 2	5.7	4.0	5.1	0.9	0.78	4.44

Table 17. - *Calliotropis zone* : Shells measurements in mm for types.

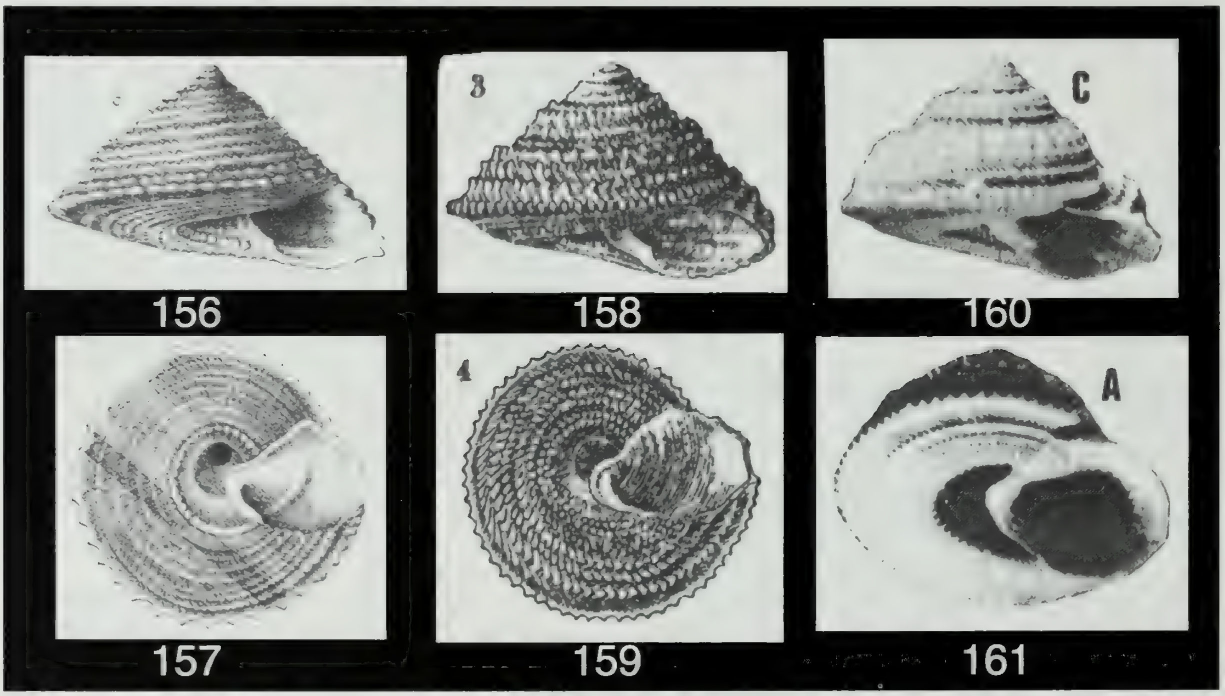
Discussion. *Calliotropis zone* n. sp. is close to *C. muricata* (Schepman, 1908) (Figs 70-71) from Indonesia, but this similar in size species has a more elevated spire, similar thick, blunt beads on the adapical and abapical main spiral cords, a more convex base and only 2 spiral cords inside the umbilicus.

The new species may also be compared to *C. cycloeides* n. sp. (Figs 102-105) from Fiji and New Caledonia, but this species has broader protoconch, a different ontogeny of cords (especially with P1 appearing very late) and a spiral cord P3 with very spiny, widely spaced nodules.

The new species is also superficially similar to *C. eucheloides* Marshall, 1979 (Figs 138-155, 160-161) from Indo-Pacific, but this slightly larger species has a very different general shape with bell-shape last whorls and a prominent adapical, peripheral spiral cord with closely packed, axially elongated beads; this widespread species has 6 spiral cords on the base.

Remarks. One can wonder about the Taiwanese record of this new Caledonian species, but the specimen, although encrusted, shows clearly the descriptive ontogeny of the spiral cords at the same time on the whorls, on the base and inside the umbilicus.

Etymology. Crossbelt (Greek : ζωνη), used as a noun in apposition - with reference to the strong peripheral spiral cord on the last whorl of the shell.



Figures 156-161

156-157. *Calliotropis calcarata* (Schepman, 1908), drawings of the orginal description (pl.IV, fig 2b-c).
158-159. *C. galea* (Habe, 1953), drawings of the orginal description (p.135, fig 3-4).
160-161. *C. eucheloides* Marshall, 1979, pictures of the orginal description (p.541, figs 3A,C).

Calliotropis oregmene n. sp.
Figs 186-189, Table 18

Type material. Holotype (5.6 x 7.9 mm) MNHN (9868). Paratypes : 4 MNHN (9869).

Type locality. Fiji, Bligh Water, MUSORSTOM 10: stn CP1342, 16°46'S, 177°39.7'E, 650-701 m.

Material examined. Fiji. MUSORSTOM 10: stn CP1342, 16°46'S, 177°39.7'E, 650-701 m, 5 lv, 1 dd sub (with holotype and paratypes). - BORDAU 1: stn DW1459, 17°18'S, 179°33'W, 820-863 m, 9 lv, 4 dd juv. - Stn DW1485, 19°03'S, 178°30'W, 700-707 m, 45 dd, 50 juv.

Distribution. Fiji, alive in 701-820 m.

Diagnosis. A small ivory white *Calliotropis* species with a rather depressed, cyrtoconoidal spire, a transversally elongated aperture, 2 granular spiral cords on first whorls and 4 granular, more or less similar in size, spiral cords on last whorl; brown periostracum; base with 4 spiral cords; broad umbilicus with very gently sloping walls and without spiral cord inside.

Description. *Shell* of small size for the genus (height up to 5.7 mm, width up to 7.9 mm), broader than high, rather thin, conical to slightly coeloconoidal; spire moderately elevated, height 0.7x to 0.8x width, 3.3x to 3.9x aperture height; broad umbilicus.
Protoconch of about 350 µm, of 1 whorl, glassy, without clearly visible terminal varix.
Teleoconch up to 5.2 convex whorls, bearing up to 4 spiral granular cords similar in size; nodules from cords produced by intersections with axial ribs; axial sculpture only weakly visible on last whorl near nodules of spiral cords.
Suture impressed, canaliculated.
First whorl convex, sculptured by 16 to 18 prosocline, smooth, moderately thick ribs; interspace between ribs about 2x broader than ribs. Primary spiral cords P1 appearing at begin of second whorl and P3 about a quarter of whorl later, poorly distinct, similar in size. On third whorl, P3 slightly stronger than P1; beads of cords becoming sharp; P2 absent; P4 emerging weakly from suture at end of whorl, granular, similar to P3; axial ribs weaker than on preceding whorl. On fourth whorl, P1 and P3 stronger, with nodules sharp, well spaced: nodules of P3 oriented at 30°, nodules of P1 almost vertically oriented; axial sculpture obsolete; S1 appearing, nodular like other cords. On last whorl, P4 slightly weaker then P3, giving a bicarinate shape to the whorl; nodules of P4 sharp, almost horizontally oriented.
Aperture subelliptic, transversally elongated; outer lip rather thick, meeting inner lip without distinct angle.
Columella more or less straight, with expansion covering partly umbilicus, without basal tooth.
Base almost flat, slightly convex, with 4 spiral cords; outermost and innermost cord granular, with sharp granules, two other cords subgranular, with smaller beads; distance between cords about 2x size of cords; axial ribs between spiral cords obsolete or almost absent.
Umbilicus very wide, diameter from 35% to 40% of shell width, shallow, funnel shaped, with very gently sloping walls, thin axial ribs and no spiral cord within.
Colour of teleoconch and protoconch ivory white; periostracum brown.

	TW	H	W	HA	H/W	H/HA
holotype	5.2	5.6	7.9	1.6	0.71	3.50
paratype MNHN 1	4.9	5.7	7.4	1.5	0.77	3.80
paratype MNHN 2	4.9	5.5	7.0	1.4	0.79	3.93
paratype MNHN 3	4.9	5.7	7.1	1.7	0.80	3.35
paratype MNHN 4	5.1	5.6	7.4	1.7	0.76	3.29

Table 18. - *Calliotropis oregmene* : Shells measurements in mm for types.

Discussion. *Calliotropis oregmene* n. sp. is rather close to *C. calatha* (Dall, 1927) from western Atlantic, but this taller, rather variable species has a conical, not cyrtoconoidal, shape, a subcircular aperture and a broader umbilicus; moreover, it lacks the spiral cord S1 and its P2 cord has smaller, more numerous beads.
The new species may remembers *C. carinata* Jansen, 1994 (Figs 184-185) from eastern Australia, but this similar in size species lacks the spiral cord S1, having only 3 spiral cords on the last whorl instead of 4, has a subcircular aperture, thinner basal spiral cords and its umbilicus has steep sloping walls.
C. oregmene n. sp. may be compared to *C. abyssicola* Rehder & Ladd, 1973 from central Pacific, but this slightly taller species has a subquadrate aperture, thinner spiral cords on the whorls and more numerous (from 6 to 8) thinner spiral cords on the base.
The new species remembers also weakly *Calliotropis oros marquisensis* n. ssp. (Figs 124-129), but this species from Marquesas Islands lacks a spiral cord P2,

has tertiary spiral cords between P1 and P3, more numerous sprical cords on the base and a wider umbilicus.

Etymology. Elongated (Greek : ορεγμενος) - with reference to the peculiar shape of the aperture.

Calliotropis cycloeides n. sp.

Figs 102-105, Table 19

Type material. Holotype (5.0 x 7.1 mm) MNHN (9870). Paratypes: 3 MNHN (9871 & 9872).

Type locality. Fidji, BORDAU 1, stn DW1496, 18°43'S, 178°23'W, 392-407 m.

Material examined. Fiji. BORDAU 1: stn DW1421, 17°08'S, 178°59'W, 403-406 m, 6 dd. - Stn DW1422, 17°08'S, 178°59'W, 360-371 m, 1 dd. - Stn DW1423, 17°08'S, 178°59'W, 402-410 m, 2 dd (paratypes 9872), 2 dd sub, 2 dd juv. - Stn DW1463, 18°10'S, 178°44'W, 300-400 m, 1 dd. - Stn DW1496, 18°43'S, 178°23'W, 392-407 m, 2 dd (holotype and paratype 9871).
Loyalty ridge. MUSORSTOM 6: stn DW392, 20°47'S, 167°05'E, 340 m, 1 dd. - Stn DW446, 20°54'S, 167°19'E, 360 m, 1 dd.
New Caledonia. BATHUS 1: stn DW654, 237-298 m, 21°17'S, 165°57'E, 1 dd. - BATHUS 2: stn DW757, 22°20'S, 166°13'E, 330 m, 1 dd.
Solomon Islands. SALOMON 1: stn DW1855, 9°46.4'S, 160°52.9'E, 252-263 m, 1 dd, 2 dd juv. - Stn DW1856, 9°46.4'S, 160°52.3'E, 254-281 m, 1 dd.

Distribution. South-western Pacific (from Solomon Islands to Fiji), 371-403 m

Diagnosis. A small *Calliotropis* species with a moderately depressed, conical shape, white, with thin axial ribs on the whole surface, up to 3 nodular spiral cords on spire whorls, the abapical cord the strongest with sharp spines; one additional thin, granular, spiral cord on last whorl; base with 3 granular spiral cords; large umbilicus with 2 spiral cords inside.

Description. *Shell* of small size for the genus (height up to 5.0 mm, width up to 7.1 mm), broader than high, rather thin, conical or slightly cyrtoconoidal; spire moderately depressed, height 0.7x to 0.8x width, 4.0x to 5.0x aperture height; umbilicus rather broad.
Protoconch from 200 to 250 µm, of 1 whorl, glassy, with a very weak terminal varix.
Teleoconch up to 5.8 weakly convex whorls, bearing up to 4 spiral granular cords and prosocline ribs; nodules from cords produced by intersections with axial ribs.
Suture impressed, weakly canaliculated.
First whorl convex, sculptured by 15 slightly prosocline smooth ribs, interspace between ribs about 2x to 2.5x broader than ribs; primary spiral cords P2 and P3 appearing at first half of whorl, both weak, granular, clearly visible at end of whorl. On second whorl, P2 and P3 similar in size; axial ribs weakly stronger than on first whorl. On third whorl, beads of both P2 and P3 strongly sharp, beads of P3 horizontally oriented, the ones of P2 slightly adapically oriented; shoulder at P2 with an almost horizontal ramp; axial ribs becoming obsolete. On fourth whorl, P1 appearing, granular, beads quickly slightly sharp; nodules of P2 and P3 sharp and scaly, nodules of P3 much longer; thin crowded axial ribs on whole surface of whorl, distance between similar in size to ribs; ribs almost orthocline between suture and P1, more prosocline towards abapical part of whorl. On fifth whorl, P3 the strongest, P1 the weakest; beads of P1 scaly like those of P2 and P3; P1 making shoulder with an almost horizontal ramp. On last whorl, P4 emerging from suture, granular, slightly scaly, weaker than P1; distance between P2 and P3 bigger than other distances between cords.
Aperture subquadrate, inclined backward; outer lip thin, meeting inner lip with an obtuse, poorly marked, angle.

Figures 162-179. Scale bar = 5 mm.

162-167. *Calliotropis calcarata* (Schepman, 1908).
162-163. Syntype ZMA, Indonesia, 216 m [SIBOGA, stn 302], 4.5 x 8.3 mm; **164-165.** MNHN, Indonesia, Tanimbar Is., 285-297 m [KARUBAR, stn CP83], 5.2 x 8.3 mm; **166-167** MNHN,. Solomon Islands, 194-286 m [SALOMON 1, stn DW1768], 4.4 x 7.7 mm.
168-171. *C. pulchra* (Schepman, 1908), Indonesia.
168-169. Syntype ZMA, Indonesia, 397 m [SIBOGA, stn 256], 6.5 x 13.0 mm; **169-170.** MNHN, Tanimbar Is., 285-297 m [KARUBAR, stn CP83], 7.9 x 13.3 mm.
172-175. *C. limbifera* (Schepman, 1908).
172-173. MNHN, Loyalty Ridge, 300-315 m [BIOGEOCAL, stn DW253], 4.3 x 6.0 mm; **174-175.** Holotype ZMA (3.08.055), south-western Philippines, 522 m [SIBOGA, stn 95], 7.4 x 11.3 mm.
176-179. *C. pistis* n. sp., New Caledonia.
176-177. Holotype MNHN (9851), Loyalty Ridge, 780 m [MUSORSTOM 6, stn CP438], 9.3 x 11.5 mm; **178-179.** MNHN, 720 m [MUSORSTOM 4: stn DC168], 10.1 x 12.9 mm.

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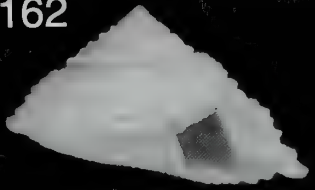

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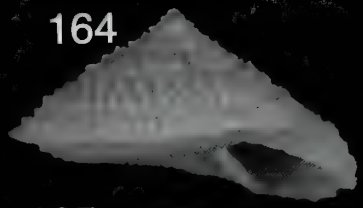

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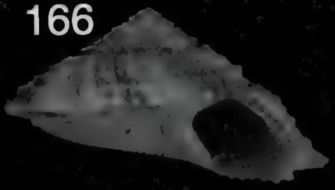

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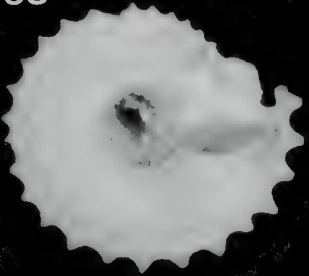

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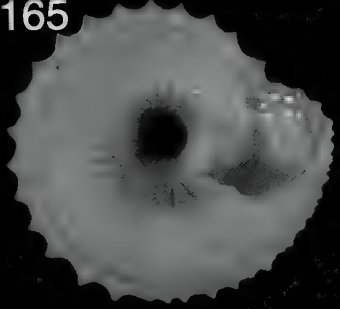

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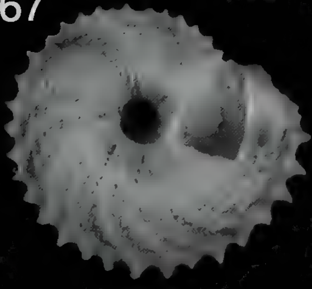

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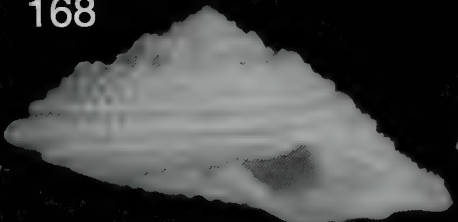

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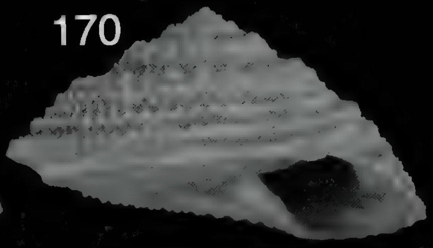

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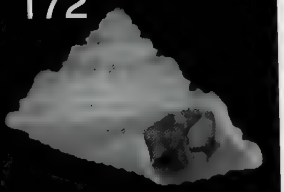

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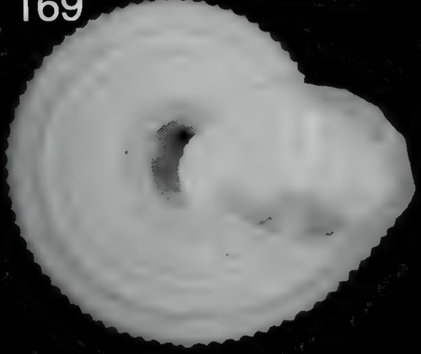

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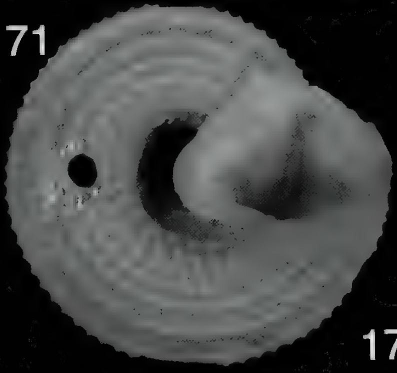

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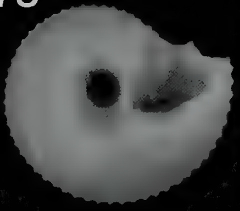

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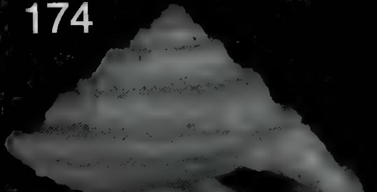

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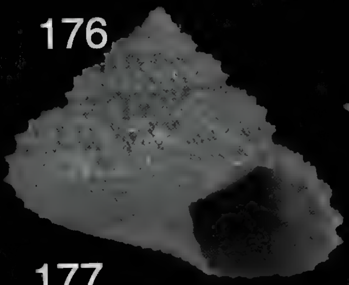

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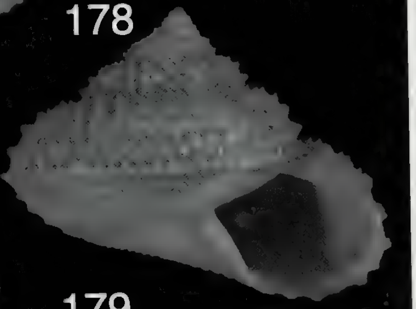

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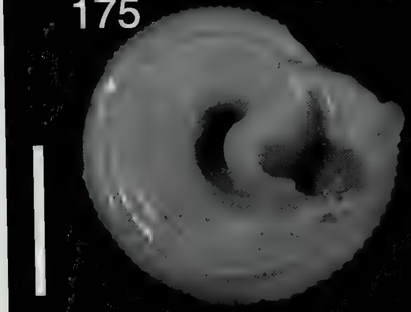

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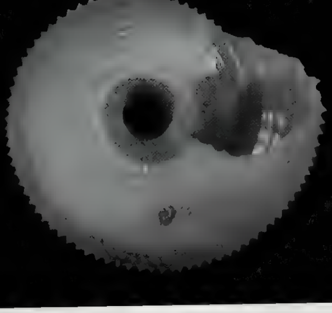

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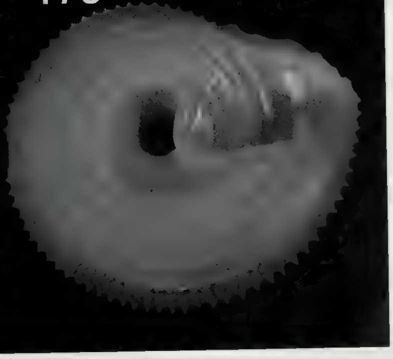


Columella curved in the middle, sometimes slightly reflected into umbilicus, without tooth.
Base almost flat or very weakly convex, with 3 thick granular spiral cords; distance between cords similar in size to cords; axial ribs between cords, connecting beads of spiral cords.
Umbilicus rather broad, diameter ca. 20% to 25 % of shell width, deep, funnel shaped, with strong, lamellose, widely spaced, axial ribs and 2 granular spiral cords within, the innermost one scaly.
Colour of teleoconch white with pinkish dots on spines of spiral cords; protoconch white.

	TW	H	W	HA	H/W	H/HA
holotype	5.6	5.0	7.1	1.1	0.70	4.55
paratype MNHN 1496	5.7	4.4	6.3	1.1	0.70	4.00
paratype MNHN 1423/1	5.8	4.7	6.0	1.0	0.78	4.70
paratype MNHN 1423/2	5.5	4.5	6.2	0.9	0.73	5.00

Table 19. - *Calliotropis cycloeides* : Shells measurements in mm for types.

Discussion. The combination of a moderately depressed spire, a spiral cord P3 with strong spiny scales, a flat base with 3 thick granular spiral cords and a broad umbilicus with 2 spiral cords within makes *Calliotropis cycloeides* n. sp. hard to confuse with another *Calliotropis* species, except with *C. gemmulosa* (A.Adams, 1860) from Japan and Philippines (see Higo, Callomon & Goto, 2001, for an illustration of the MNH holotype), but this species has a cyrtonoidal shape, much more convex whorls and a broader umbilicus with only one spiral cord inside.
C. cycloeides n. sp. is rather close to *C. sagarinoi* Poppe, Tagaro & Dekker, 2006 from Philippines, but this species has a less elevated spire, a cyrtoconoidal shape, only 2 spiral cords on the base and no spiral cord inside the umbilicus. Specimens of the new species from Solomon Islands are more depressed as specimens from Fiji and New Caledonia, being more similar to *C. sagarinoi*, but they keep the characteristic 3 spiral cords on the base and 2 spiral cords inside the umbilicus.
The new species may remember *C. bucina* Vilvens, 2006 (Figs 106-107) from Réunion and Mayotte Islands, but this species is a bit smaller for a similar number of whorls and has more convex whorls, a cyrtoconoidal shape, a spiral cord S1 always present and a spiral cord P3 that is the only one strongly spiny.

Etymology. Wheel shaped (Greek : κυκλος) - after the general shape of the shell, evoking a toothed wheel.

Calliotropis eucheloides Marshall, 1979
Figs 138-155, 160-161, Tables 20, 21

Calliotropis eucheloides Marshall, 1979: 527-528, figs. 3A-C, tab. 2. Type locality: Kermadec Islands (Raoul Is.), 29°15.5'S, 177°50'W, 366-402 m.
Other references :
Calliotropis eucheloides - Poppe, Tagaro & Dekker, 2006: 63.
Calliotropis eucheloides - Vilvens, 2006: 62, figs. 24-27.

Remarks about three related species.

Some authors (e.g. Poppe et al., 2006) have pointed out that some confusion exists between the three species *Calliotropis calcarata* (Schepman, 1908) (Figs 156-157, 162-167) from Indonesia, *C. galea* (Habe, 1953) (Figs 80-83, 158-159) from Japan and *C. eucheloides* Marshall, 1979 from Indo-Pacific. Regarding the original descriptions and material from types or certified specimens, the differences between the three species seems nevertheless rather clear ("i:Pj-Pk" below means "spiral cords Pi and Pj appear at whorl #i" and "i:Pj/2" means "spiral cord Pj divides in two cords at whorl #i") :

- *C. calcarata* has a depressed spire, with 6 even spaced spiral cords on the last whorl (1:P1-P3; 3:P2-P4; 4:S1, S2) with granules of P4 sharp, not axially elongated, at most a very weak columellar basal tooth, 7-8 granular spiral cords on the base, a wide umbilicus with 1 spiral cord inside.
- *C. galea* has also a rather depressed spire, 5 spiral cords on the last whorl (1:P1-P2; 3:P3; 4:S1;6:P1/2) with granules of P3 axially elongated (prosocline shape of ribs) and distance between adapical cords smaller than distance between abapical cords, a weak columellar basal tooth, 6 granular spiral cords on the base, a wide umbilicus with 1 spiral cord inside.
- *C. eucheloides* has a more elevated spire, 5 spiral cords on the last whorl (1:P1-P2; 3:P3, S1;5:P1/2) with granules of P3 axially elongated (prosocline shape of ribs) and distance between adapical cords smaller than distance between abapical cords, a strong (sometimes acute) columellar basal tooth, a base with 6 granular spiral cords or nearly smooth (all intermediates exist), a wide umbilicus with 1 spiral cord inside.

Poppe et al. (2006) suspected however that *C. eucheloides* could be a synonym of *C. calcarata*. They described from Philippines an additional species related to these three (?) species : *C. virginiae* Poppe, Tagaro & Dekker, 2006, close to *C. galea* but said to be different by the shape of the spire, the whorls and the beads of the spiral cords.

Remarks on the variation of *C. eucheloides*.

On the other hand, *C. eucheloides* brings another problem, that is its high variability regarding the height of the shell and moreover the sculpture of its base. In the studied material (see list below), high variations for the basal sculpture were indeed found.

Some of studied specimens (including also material from Philippines provided by malacologists-dealers as G. Poppe and F. Dedonder), show the typical characters of the species - let's talk about these specimens as belonging to the "typical form", with 6 granular basal spiral cords and a spiral cord inside the umbilicus (Figs 138-145). This is the single form that can found outside the New Caledonia area throughout the western Pacific Ocean and the Indian Ocean. But some other specimens collected in New Caledonia and Loyalty Islands area seemed however, at first look, to belong to another species, because they have

- a smooth base instead basal granular spiral cords;
- no spiral cord within the umbilicus;
- a spire slightly more elevated (ratio H/W larger).

- let's talk about these specimens as belonging to the "smooth form" (Figs 152-155).

A first look to the distribution of the two kinds of specimens reveal that there is no geographic separation between them : the two kind of shells were found together in 5 stations of similar depth from New Caledonia and Loyalty Islands.

Location	Depth
New Caledonia	
18°52'S, 163°23'E	502-516 m
18°56'S, 163°22'E	444-452 m
22°54'S, 167°13'E	435-447 m
22°58'S, 167°33'E	410-440 m
Loyalty Islands	
20°41'S, 167°07'E	373 m

Table 20. - *Calliotropis eucheloides* : locations of simultaneous occurrences of typical form and smooth form.

More accurate studies regarding the H/W ratio for random samples gave the following result for typical and smooth form of the species :

form of shell	Frequency	H/W : mean	H/W : standard deviation
"typical"	59	0.70593964	0.07791968
"smooth"	25	0.73655792	0.04559639

To estimate if there was here a significant difference, we did an analysis of variance (General Linear Model procedure ANOVA of SAS software) :

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.01646169	0.01646169	3.36	0.0705
Error	82	0.40204241	0.00490296		
Corrected Total	83	0.41850410			

It is clear that there is no clear evidence of a separation between the two groups, because the probability of a invalid reject of an null hypothesis stating no significant difference is of about 7%, that is bigger than the usual significance level of 5%.

But the most convincing clue for keeping a single species is certainly given by specimens belonging to an "intermediate form" (Figs 146-151), with weak but visible, smooth or weakly granular spiral cords on the base, sometimes also with a weak spiral cord within the umbilicus. Such specimens occur in the same New Caledonia and Loyalty Islands area. Two of the three forms were found together in 5 stations of the same area, at similar depth.

Location	Depth	Kind of forms
New Caledonia		
18°29.8'S, 163°02.8'E	365 m	t.f. + i.f.
22°17'S, 167°12'E	390 m	t.f. + i.f.
22°47'S, 167°14'E	440-450 m	t.f. + i.f.
22°49'S, 167°12'E	390-395 m	s.f. + i.f.
23°00'S, 167°16'E	350 m	t.f. + i.f.

Table 21. - *Calliotropis eucheloides* : locations of simultaneous occurrences of intermediate form with typical form or smooth form (t.f. = typical form; i.f. = intermediate form; s.f. = smooth form).

The conclusion that only anatomical studies may prove definitively that there is here only one species or two; so, we keep provisionally all the specimens examined here under the only name given by Marshall. Such conchological variations among specimens of the same species are not really a wonder: for example, *Calliotropis calatha* (Dall, 1927) from western Atlantic is in the same way also extremely variable (Quinn, 1979: 9-13, figs 15-20).

Material examined. (t.f. = typical form; i.f. = intermediate form; s.f. = smooth form).

New Caledonia. Vauban 1978-79: stn 3, 22°17'S, 167°12'E, 390 m, 4 dd t.f. 1 dd i.f. - Stn 4, 22°17'S, 167°13'E, 400 m, 2 dd t.f. 30 lv i.f., 10 lv juv i.f. - Stn 15, 22°49'S, 167°12'E, 390-395 m, 20 lv s.f., 4 lv juv. s.f., 13 lv i.f., 2 lv juv i.f. - Stn 16, 22°46'S, 167°12'E, 390-400 m, 10 dd i.f. - Stn DW20, 22°44'S, 167°42'E, 415-470 m, 3 dd t.f. - Northern lagon: stn 475, 18°36'S, 163°11'E, 415-460 m, 1 dd t.f. - Surprise atoll, Lagon 8: stn 444, 18°15'S, 162°59'E, 300-350 m, 1 dd s.f. - BIOCAL: stn DW37, 23°00'S, 167°16'E, 350 m, 1 dd juv t.f., 2 lv i.f. - Stn DW43, 22°46'S, 167°15'E, 400 m, 1 dd t.f. - Stn DW44, 22°47'S, 167°14'E, 440-450 m, 15 dd t.f., 15 dd juv t.f., 1 dd i.f. - Stn DW77, 22°15'S 167°15'E, 440 m, 25 dd t.f. 15 jv dd t.f. - MUSORSTOM 4: stn DW156, 18°54'S, 163°19'E, 525 m, 7 dd t.f., 1 dd juv t.f. - Stn DW162, 18°35'S, 163°10'E, 525 m, 7 dd t.f., 1 dd juv t.f. - Stn CP171, 18°58'S, 163°14'E, 425 m, 2 dd t.f. - Stn CP180, 18°57'S, 163°18'E, 440 m, 4 dd t.f. - Sn DW181, 18°57'S, 163°22'E, 350 m, 60 dd s.f. - Stn DW182, 18°59'S, 163°24'E, 305 m, 2 dd s.f. - Stn CP193, 18°56'S, 163°23'E, 415 m, 5 dd s.f. - Stn CP195, 18°55'S, 163°22'E, 465 m, 1 dd s.f. - Stn DW196, 18°55'S, 163°24'E, 550 m, 5 dd t.f;, 1 dd juv s.f. - Stn DW197, 18°51'S, 163°21'E, 550 m, 2 dd t.f. - Stn DW212, 22°47'S, 167°10'E, 375-380 m, 60 dd i.f. - Stn DW222, 22°58'S, 167°33'E, 410-440 m, 2 dd t.f., 1 dd s.f. - Stn DW222, 22°58'S, 167°33'E, 410-440 m, 2 dd t.f. - Stn CC247, 22°09'S, 167°13'E, 435-460 m, 3 dd t.f. - Stn CC246, 22°08'S, 167°11'E, 410-420 m, 1 dd t.f. - SMIB 3: stn DW28, 22°47'S, 167°12'E, 394 m, 16 dd i.f. - Stn DW29, 22°47'S, 167°12'E, 405 m, 60 lv i.f. - Secteur des Belep, stn 1152, 18°58'S, 163°24'E, 335 m, 40 dd s.f. - Stn 1153, 18°58'S, 163°23'E, 330 m, 4 dd s.f. - HALICAL 1: stn DW01, 18°56'S, 163°24'E, 380-400 m, 7 dd s.f. - Sn DW04, 18°55'S, 163°24'E, 350-365 m, 1 lv s.f. - SMIB 6: stn DW110, 19°05'S, 163°30'E, 225-230 m,1 dd s.f. - Stn DW118, 18°58'S, 163°26'E, 290-300 m, 2 dd s.f. - Stn DW121, 18°58'S, 163°26'E, 315 m, 3 dd s.f. - Stn DW123, 18°57'S, 163°25'E, 330-360 m, 1 dd s.f. - SMIB 10: stn DW215, 24°56'S, 168°21'E, 508-553 m, 1 dd s.f. - SMIB 8 : stn DW187, 23°17'S, 168°06'E, 390-540 m, 1 dd i.f. - Stn DW189, 23°18'S, 168°06'E, 400-402 m, 1 dd i.f. - Stn DW197-199, 22°51'S-22°52'S, 167°12'-168°12'E, 408-436 m, 70 dd i.f. - BATHUS 2: stn 4, 22°17'S, 167°13'E, 400 m, 2 dd t.f. - Stn DW719, 22°48'S, 167°16'E, 444-445 m, 2 dd s.f. - Stn DW723, 22°50'S, 167°27'E, 430-433 m, 4 dd t.f. - Stn DW729, 22°52'S, 167°12'E, 400 m, 40 dd. i.f. - Stn DW730, 23°03'S, 166°58'E, 397-400 m, 11 dd t.f., 2 dd juv t.f. - Stn DW733, 22°55'S, 166°49'E, 520 m, 6 dd t.f. - Stn DW731, 22°49'S, 166°45'E, 300-370 m, 2 dd t.f. - Stn DW758, 22°18'S, 166°11'E, 377-386 m, 1 dd and 1 dd juv. t.f. - Stn CP760, 22°19'S, 166°11'E, 455 m, 6 dd t.f. - Stn CP761, 22°19'S, 166°11'E, 490-500 m, 5 dd t.f. - HALIPRO 1: stn CP877, 23°03'S, 166°59'E, 464-480 m, 1 dd t.f. - SMIB 2: stn DW3, 22°56'S, 167°15'E, 412-428 m, 4 dd i.f. - Stn DW4, 22°53'S, 167°13'E, 410-417 m, 1 dd i.f. - Stn DW8, 22°54'S, 167°13'E, 435-447 m, 1 dd t.f., 1 dd s.f. - Stn DW16, 22°51'S, 167°12'E, 390 m, 7 dd i.f. - Stn DW21, 22°40'S, 167°41'E, 460-500 m, 2 dd t.f. - Stn DW23, 22°31'S, 167°37'E, 410-420 m, 5 dd t.f. - BATHUS 4: stn CP889, 21°01'S, 164°27'E, 416-433 m, 4 dd t.f. - Stn DW924, 18°55'S, 163°24'E, 344-360 m, 40 dd s.f. - Stn DW925, 18°55'S, 163°24'E, 370-405 m, 50 lv s.f. - Stn DW926, 18°57'S, 163°25'E, 325-330 m, 40 dd s.f. - Stn DW927, 18°56'S, 163°22'E, 444-452 m, 15 lv s.f. - Stn DW929, 18°52'S, 163°23'E, 502-516 m, 1 lv t.f. 5 dd s.f. - Stn DW927, 18°56'S, 163°22'E, 444-452 m, 1 dd t.f. 40 dd s.f. - Stn DW931, 18°55'S, 163°24'E, 360-377 m, 42 dd t.f., 3 dd juv dd s.f. - Stn DW932, 19°08'S, 163°29'E, 170-190 m, 2 dd s.f. - Stn CP939, 18°58'S, 163°25'E, 304-320 m, 9 dd s.f. - Stn DW940, 19°00'S, 163°26'E, 305 m, 40 dd s.f. - Stn DW941, 19°02'S, 163°27'E, 270 m, 1 dd s.f. - Stn DW945, 20°12'S, 164°34'E, 530-620 m, 6 dd t.f. - PALEO-SURPRISE: stn DW1391, 18°29.8'S, 163°02.8'E, 365 m, 2 dd juv t.f. 1 dd i.f. - Stn CP1392, 18°29.8'S, 163°02, 370 m, 6 dd t.f., 1 dd juv t.f. - NORFOLK 1: stn DW1716, 23°22'S, 168°03'E, 266-276 m, 1 dd i.f. - Stn DW1729, 23°20'S, 167°16'E, 340-619 m, 3 lv i.f. - Stn DW1733, 22°56'S, 167°15'E, 427-433 m, 1 dd i.f., 1 dd juv i.f. - Stn DW1736, 22°51'S, 167°12'E, 383-407 m, 60 lv i.f. - Stn DW1737, 22°52'S, 167°12'E, 343-400 m, 100 lv i.f. - Stn DW1738, 22°51'S, 167°10'E, 340-381 m, 50 lv i.f. - Stn DW1739, 22°51'S, 167°12'E, 404-448 m, 1 dd i.f.

Norfolk Ridge. BATHUS 3: stn CP829, 23°21'S, 166°02'E, 386-390 m, 1 dd t.f. - Stn DW838, 23°01'S, 166°56'E, 400-402 m, 12 dd t.f. - Stn DW937, 23°02'S, 166°57'E, 402-412 m, 7 dd t.f. - Stn DW838, 23°01'S, 166°56'E, 400-402 m, 1 dd t.f.

Chesterfield Islands. Coral sea. MUSORSTOM 5: stn 334, 20°06'S 158°48'E, 315-320 m, 1 dd t.f. - Stn 361, 19°53'S, 158°38'E, 400 m, 5 dd t.f. - Stn 378, 19°54'S, 158°38'E, 355 m, 1 dd t.f. - Stn 379, 19°53'S, 158°40'E, 370-400 m, 4 dd t.f., 1 dd juv t.f. - Stn 382, 19°37'S, 158°43'E, 580 m, 1 dd juv t.f. - Stn 362, 19°53'S, 158°40'E, 410 m, 1 dd t.f., 1 dd juv t.f.

Loyalty Islands. MUSORSTOM 6: stn DW391, 20°47'S, 167°06'E, 390 m, 1 dd t.f. - Stn DC402, 20°30'S, 166°49'E, 520 m, 3 dd s.f. - Stn DW406, 20°41'S, 167°07'E, 373 m, 1 dd t.f., 1 dd juv t.f., 1 dd s.f. - Stn DW410, 20°38'S, 167°07'E, 490 m, 1 dd t.f. -

Stn DW411, 20°40'S, 167°03'E, 424 m, 1 dd t.f. - Stn DW428, 20°24'S, 166°13'E, 420 m, 1 dd t.f. - Stn DW459, 21°01'S, 167°31'E, 425 m, 2 dd t.f.. - Stn CP465, 21°04'S, 167°32'E, 480 m, 1 dd t.f. - Stn DW487, 21°23'S, 167°46'E, 500 m, 1 dd t.f. - SMIB 5: stn DW91, 22°18'S, 168°41'E, 340 m, 1 dd i.f. - Stn DW87, 22°19'S, 168°41'E, 370 m, 2 dd i.f. - BIOGEOCAL: stn DW308, 20°40'S, 166°58'E, 510-590 m, 1 dd t.f., 1 dd juv t.f.

Fidji. BORDAU 1 : stn DW1421, 17°08'S, 178°59'W, 403-406 m, 5 dd t.f. - Stn DW1499, 18°40'S, 178°27'W, 389-400 m, 4 dd t.f., 3 dd sub t.f. - Stn DW1496, 18°43'S, 178°23'W, 392-407 m, 7 dd, t.f. - Stn DW1499, 18°40'S, 178°27'W, 389-400 m, 2 dd, t.f.

Vanuatu. MUSORSTOM 8: stn DW978, 19°23'S, 169°27'E, 408-413 m, 20 dd t.f. - Stn DW972, 19°22'S, 169°28'E, 487-507 m, 1 dd t.f. - Stn CP980, 19°21'S, 169°25'E, 433-450 m, 3 dd t.f. - Stn DW1060, 16°14'S, 167°21'E, 375-397 m, 1 dd juv t.f. - Stn DW1065, 16°16'S, 167°21'E, 360-419 m, 1 dd t.f., 1 dd juv t.f. - Stn CP973, 19°21'S, 169°27'E, 460-480 m, 1 dd t.f. - Stn CP963, 20°20'S, 169°49'E, 400-440 m, 4 dd t.f.

Wallis Island. MUSORSTOM 7: stn DW526, 13°13'S, 176°15'W, 335-360 m, 1 dd t.f. - Stn DW523, 13°12'S, 176°16'W, 455-515 m, 1 dd t.f., 1 dd juv t.f. - Stn CP606, 13°21'S, 176°08'W, 420-430 m, 1 dd t.f. - Stn DW604, 13°21'S, 176°08'W, 415-420 m, 1 dd t.f. - Stn DW605, 13°21'S, 176°08'W, 335-340 m, 1 dd t.f. - Stn DW601, 13°19'S, 176°17'W, 350 m, 1 dd t.f., 15 dd juv t.f.

Futuna Island. MUSORSTOM 7: stn DW511, 14°14'S, 178°11'W, 400-450 m, 1 dd t.f.

Waterwitch bank. MUSORSTOM 7: stn DW569, 12°30'S, 176°51'W, 300-305 m, 1 dd t.f.

Tonga. BORDAU 2: stn DW 1548, 20°38'S, 175°03'W, 476-478 m, 1 dd t.f. - Stn DW 1577, 19°42'S, 174°19'W, 257-265 m, 1 dd t.f. - Stn DW 1628, 23°22'S, 176°18'W, 400-416 m, 1 dd t.f. - Stn DW1631, 23°23'S, 176°18'W, 407-443 m, 1 dd t.f.

Solomon Islands. SALOMON 1: stn DW1768, 8°21.4'S, 160°41.8'E, 513-564 m, 1 dd t.f. - Stn DW1769, 8°20.4'S, 160°40.6'E, 200-303 m, 9 dd, 1 dd sub t.f., 1 dd juv t.f. - Stn CP1771, 8°17.1'S, 160°38.4'E, 411-498 m, 1 dd t.f. - Stn DW1776, 8°20.7'S, 160°40.7'E, 295-381 m, 7 dd t.f. - Stn DW1795, 9°18.8'S, 160°22.9'E, 442-451 m, 2 dd t.f. - Stn DW1800, 9°21.4'S, 160°23.9'E, 357-359 m, 2 dd t.f. - Stn DW1817, 9°48.2'S, 160°54.3'E, 233-269 m, 1 dd t.f. - Stn DW1820, 9°52.3'S, 160°51.4'E, 256-329 m, 3 dd t.f. - Stn DW1824, 9°48.6'S, 160°56.0'E, 298-318 m, 1 dd t.f. - Stn DW1825, 9°50.5'S, 160°58.0'E, 340-391 m, 1 dd t.f. - Stn DW1847, 10°25.7'S, 161°50.8'E, 148-210 m, 1 dd t.f. - Stn DW1855, 9°46.4'S, 160°52.9'E, 252-263 m, 2 dd t.f., 4 dd juv t.f.

Indonesia. KARUBAR : stn DW02, 05°47'S, 132°13'E, 209-240 m, 2 dd t.f., 1 dd juv t.f. - Stn DW03, 05°48'S, 132°13'E, 278-301 m, 2 dd t.f..

Distribution. Typical form : south-western Pacific (from Solomon Islands to Tonga), alive in 502-516 m, shells in 210-580 m (range computed using also the material examined by Marshall, 1979); Philippines, 150-300 m; Indonesia, 240-278 m; western Indian Ocean, 450 m (Vilvens, 2006). - Smooth form : south-western Pacific (from New Caledonia to Loyalty Islands), alive in 365-444 m, shells in 190-550 m. - Intermediate form : south-western Pacific (from New Caledonia to Loyalty Islands), alive in 350-405 m, shells in 276-510 m.

Calliotropis nux n. sp.

Figs 238-241, Table 22

Type material. Holotype (11.0 x 14.8 mm) MNHN (9873). Paratype MNHN (9874).

Type locality. Solomon Islands, SALOMON 1, stn CP1772, 8°15.8'S, 160°40.4'E, 570-756 m.

Material examined. Solomon Islands. SALOMON 1: stn CP1772, 8°15.8'S, 160°40.4'E, 570-756 m, 2 dd (holotype and paratype). - Stn CP1839, 10°16.1'S, 161°40.3'E, 575-624 m, 1 dd.

Distribution. Solomon Islands, 575-624 m.

Diagnosis. A rather tall, moderately depressed, nut-brown *Calliotropis* species with a cyrtoconoidal spire, a shoulder at first third, 4 granular spiral cords on whorls, the abapical cord the strongest; prosocline thin treads between the two abapical cords; base with about 5 granular, rather thick spiral cords; rather large umbilicus with a weak spiral cord inside.

Description. *Shell* rather large for the genus (height up to 11.0 mm, width up to 14.8 mm),

broader than high, rather thin, cyrtoconoidal; spire moderately depressed, height 0.7x width, 4.0x to 4.6x aperture height; rather broad umbilicus.

Protoconch of about 400 µm, of 1 whorl, dome-shaped, without terminal varix.

Teleoconch up to 6.3 convex whorls, bearing up to 4 spiral granular cords; nodules from cords produced by intersections with axial ribs; secondary thin axial ribs on abapical part of last whorls.

Suture impressed, canaliculated.

First whorl convex, sculptured by 20 almost orthocline smooth ribs, interspace between ribs 2x broader than ribs; primary spiral cords P2 and P3 appearing almost immediately, granular; P2 weaker than P3. On second whorl, P2 and P3 thicker, P2 slightly weaker than P3, making shoulder; beads of P2 bluntly sharp, beads of P3 more acute. On third whorl, P3 still slightly stronger than P2; P1 appearing at end of whorl, quickly similar in size to P2; P4 emerging from suture at end of whorl, granular, similar in strength to P2. On fourth whorl, beads of P3 strongly sharp, beads of P1 and P2 rounded; axial ribs still present, thick. On fifth whorl, beads of P3 rounded; beads of P4 sharp and more numerous; secondary thin axial, strongly prosocline ribs in area and between P3 and P4. On last whorl, P1 and P2 weaker, shoulder at P2 still visible; P3 the weakest, almost disappearing; P4 the strongest, peripheral, with crowded sharp beads; prosocline threads belt in area above P4 still visible.

Aperture subelliptic; outer lip thin, with a median angle produce by spiral P4, meeting inner lip with an obtuse, poorly marked angle.

Columella straight, slightly oblique, without basal tooth.

Base slightly convex, with 5 or 6 granular, rather thick spiral cords, innermost cord slightly stronger and bordering umbilicus; distance between cords more or less similar in size to cords; weak axial ribs between cords.

Umbilicus rather broad, diameter ca. 25% of shell width, deep, funnel shaped, with low axial ribs and with an indistinct spiral cord inside.

Colour of teleoconch and protoconch nut-brown.

	TW	H	W	HA	H/W	H/HA
holotype	6.3	11.0	14.8	2.4	0.74	4.58
paratype MNHN	5.7	7.7	11.7	1.8	0.66	4.28
sp. MNHN CP1839	5.8	8.9	12.8	2.2	0.70	4.05

Table 22. - *Calliotropis nux* : Shells measurements in mm for types and specimen.

Discussion. The peculiar combination of a rather big size, evanescent P2 and P3 and a belt of prosocline threads between P3 and P4 reduce the number of species that could be compared with the new species. *Calliotropis nux* n. sp. is close to *C. midwayensis* (Lan, 1990) (Figs 88-95) from Central Pacific and South China Sea, but this similar in size species keeps only P1 and P4 on last whorl, has no shoulder, lacks thin, prosocline threads above P4 and has thinner, smooth (instead of granular) spiral cords on the base.

The new species remembers a litlle *C. glypta* (Watson, 1879) (Figs 204-207) from eastern Australia, but this taller species has a slightly more elevated spire, much stronger P2 and P3 without shoulder and the whole surface covered by prosocline threads (not only between P3 and P4).

Etymology. Walnut (Latin : nux, -cis), used as a noun in apposition - with reference to the colour of the shell.

Calliotropis limbifera (Schepman, 1908)
Figs 172-175

Solariellopsis limbifera Schepman, 1908: 54 - 55, pl. IV, fig. 3. Type locality: South-western Philippines, 5°43.5'N, 119°40'E, 522 m.

Material examined. Loyalty Ridge. BIOGEOCAL: stn DW253, 21°32'S, 166°29'E, 300-315 m, 1 dd. - **Wallis Island.** MUSORSTOM 7: stn DW604, 13°21'S, 176°08'W, 415-420 m, 10 lv, 3 dd sub, 6 dd juv.

Distribution. Indonesia, 522 m (Schepman, 1908); south-western Pacific, 315-415 m.

Remarks. This species was originally described from south-western Philippines (near Indonesia). One can wonder about these new records in Pacific, far from the type locality and giving so a disjoint distribution, but the specimens here examined are similar to the holotype and match the original description, except that they lack the basal columellar tooth. This could be explained by the reduced number of whorls (4.6 for the largest specimens) regarding the 5.5 whorls of the examined holotype : the Pacific specimens could be not fully adult. More material is necessary to state if this is the same species or a different one.

Figures 180-197. Scale bar = 5 mm.

180-183. *Calliotropis stegos* n. sp., Solomon Islands, 513-564 m [SALOMON 1, stn CP1798].

180-181. Holotype MNHN (9886), 4.7 x 7.1 mm; **182-183.** Paratype MNHN (9887), 4.8 x 7.1 mm.

184-185. *C. carinata* Jansen, 1994, holotype AMS (C. 169586), New South Wales, off Sidney, 917-940 m, 4.2 x 5.9 mm - Photographs taken by M.Allen, AMS.

186-189. *C. oregmene* n. sp., Fiji, 700-707 m [BORDAU 1, stn DW1485].

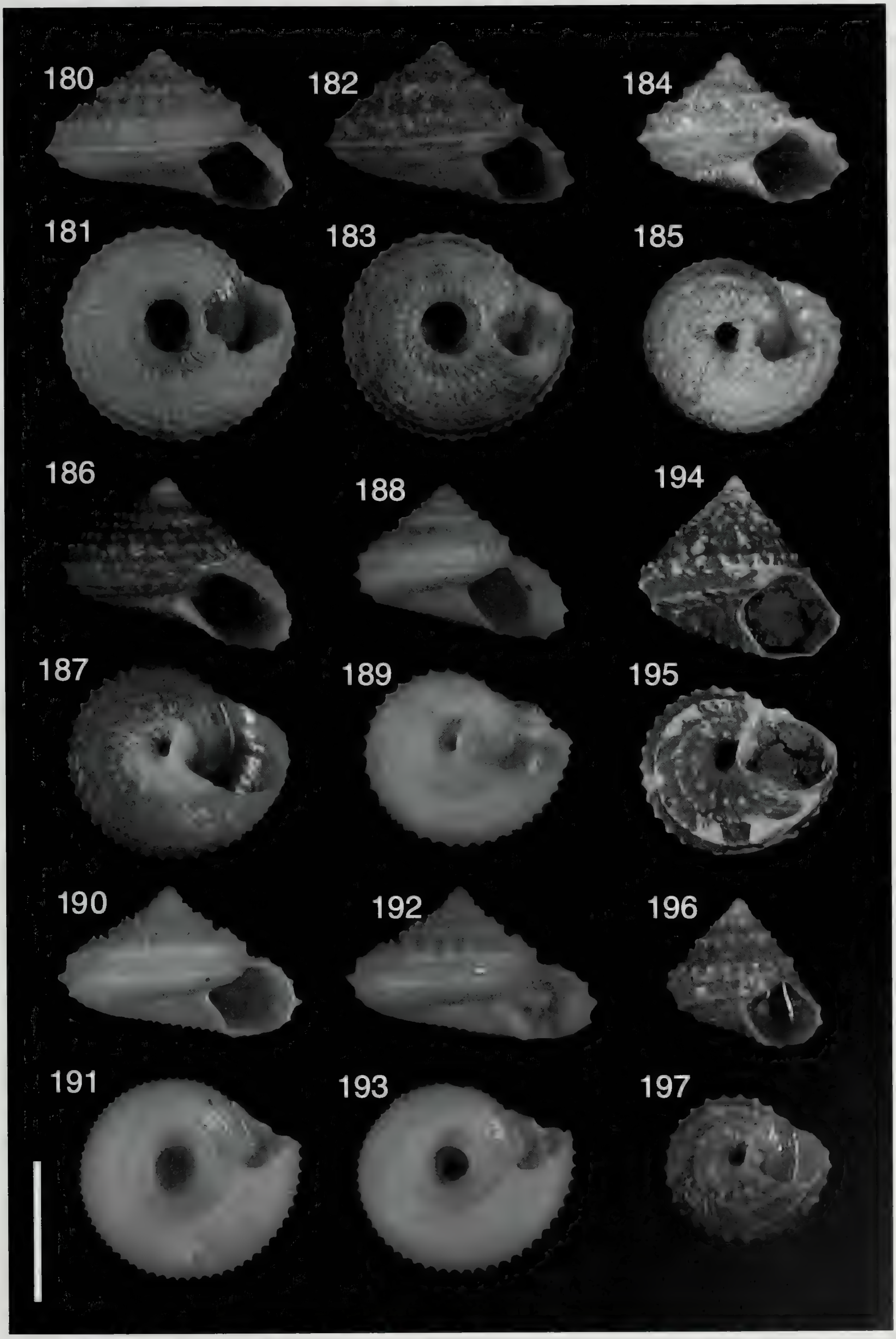
186-187. Holotype MNHN (9868), 5.2 x 6.6 mm; **188-189.** Paratype MNHN (9869), 4.7 x 6.5 mm.

190-193. *C. cooperculum* n. sp., Fiji, 700-707 m [BORDAU 1, stn DW1485].

190-191. Holotype MNHN (9888), 5.0 x 7.4 mm; **192-193.** Paratype MNHN (9889), 4.9 x 7.2 mm.

194-197. *C. stanyii* Poppe, Tagaro & Dekker, 2006. MNHN, Solomon Is., 513-564 m [SALOMON 1, stn CP1798].

194-195. 5.9 x 6.4 mm; **196-197.** 4.8 x 5.2 mm.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Calliotropis pulchra (Schepman, 1908)
Figs 168-171

Solariellopsis pulchra Schepman, 1908: 55, pl. IV, fig. 4. Type locality: Eastern Indonesia, 5°26.6'S, 132°32.5'E, 397 m.
Other reference :
Calliotropis pulchra - Vilvens, 2006: fig. 38-40.

Material examined. Indonesia. KARUBAR: stn DW07, 05°46'S, 132°21'E, 283-285 m, 9 dd, 3 dd sub, 2 dd juv. - Stn CP25, 08°30'S, 132°52'E, 336-346 m, 2 dd. - Stn DW31,- 05°40'S, 132°51'E, 288-289 m, 1 dd. - Stn CP83, 09°23'S, 131°00'E, 285-297 m, 1 dd. - Stn CP84, 09°23'S, 131°09'E, 246-275 m, 4 dd, 2 dd sub.

Distribution. Indonesia, 275-397 m (range computed using also data of Schepman, 1908).

Calliotropis oros marquisensis n. ssp.
Figs 124-129, Table 23

Type material. Holotype (6.4 x 9.4 mm) MNHN (9875). Paratypes : 5 MNHN (9876), 1 C.Vilvens coll.

Type locality. Marquesas Islands, Hiva Oa Island, MUSORSTOM 9, stn DW1207, 9°51'S, 139°10'W, 500-525 m.

Material examined. Marquesas Islands. MUSORSTOM 9: stn DW1194, 9°00'S, 139°59'W, 500 m, 1 lv. - Stn DW1207, 9°51'S, 139°10'W, 500-525 m, 52 lv, 9 lv juv (with holotype and paratypes). - Stn DR1232, 9°42'S, 139°06'W, 410-413 m, 1 dd. - Stn DW1234, 9°42'S, 139°06'W, 408 m, 1 dd, 4 juv. - Stn DR1247, 10°34'S, 138°42'W, 1150-1250 m, 1 dd. - Stn DW1270, 7°56'S, 140°43'W, 497-508 m, 4 dd. - Stn DW1272, 7°55'S, 140°44'W, 660-680 m, 2 lv. - Stn DW1281, 7°48'S, 140°21'W, 400-455 m, 2 dd, 8 sub, 2 juv. - Stn DW1301, 8°57'S, 140°15'W, 489-497 m, 3 dd.

Distribution. Marquesas Islands, alive in 500-660, shells in 408-1150 m.

Diagnosis. A small *Calliotropis* species with a moderately elevated, slightly cyrtoconoidal spire, white or brownish white, with 2 main granular spiral cords on spire whorls, the adapical cord close to suture and the other at third quarter of the height of whorl; additional weaker, granular spiral cords between the two main cords and an additional, peripheral, granular spiral cord on last whorl; base with 7 granular spiral cords; broad umbilicus usually without spiral cord inside.

Description. Same features as *Calliotropis oros oros* n. sp., differing from it by a slightly larger size comparing to the number of whorls (height up to 7.0 mm, width up to 10.0 mm, teleoconch up to 5.6 convex whorls), a more depressed spire (height 0.6x to 0.7x width) and a lesser number of slightly thicker beads for P3 and P4 on fourth whorl.

	TW	H	W	HA	H/W	H/HA
holotype	5,4	6,4	9,4	1,8	0,68	3,56
paratype MNHN 1	5,3	5,8	9,0	1,9	0,64	3,05
paratype MNHN 2	5,2	6,2	9,3	1,6	0,67	3,88
paratype MNHN 3	5,6	6,8	9,8	1,9	0,69	3,58
paratype MNHN 4	5,6	7,0	10,0	1,8	0,70	3,89
paratype MNHN 5	5,3	6,2	9,4	1,9	0,66	3,26
paratype MNHN CV	5,6	6,3	9,3	1,7	0,68	3,71

Table 23. - *Calliotropis oros marquisensis* : Shells measurements in mm for types.

Discussion. *Calliotropis oros marquisensis* n. ssp. seems to have constant features that distinct it from *C. oros oros* n. sp. (Figs 120-123). Because no intermediate forms were found, especially in the area beween Fiji Islands and Marquesas Islands, we consider provisionnally that these two subspecies are different, although further studies on additional material could show that there is only one variable species.

Etymology. From the Marquesas Islands (Latin) - with reference to the Marquesas Is. ("Marquises" in French) that are the characteristic area of the subspecies.

Calliotropis keras n. sp.
Figs 212-213, Table 24

Type material. Holotype (10.5 x 17.3 mm) MNHN (9877). Paratype MNHN (9878).

Type locality. Fiji, Bligh Water, MUSORSTOM 10, stn CP1344, 16°45.3'S, 177°40.5'E, 588-610 m.

Material examined. Fiji. MUSORSTOM 10: stn CP1344, 16°45.3'S, 177°40.5'E, 588-610 m, 2 dd (holotype and paratype), 1 dd juv. - BORDAU 1: stn CP1420, 17°05'S, 178°57'W, 550-687 m, 1 dd. - **South-western Pacific.** MUSORSTOM 7: stn CP631, 11°54'S, 179°32'W, 600 m, 1 dd. - **Tonga.** BORDAU 2: stn DW 1553, 20°42'S,174°54'W, 650-676 m, 1 dd.

Distribution. South-western Pacific (from Fiji to Tonga), 600-650 m.

Diagnosis. A rather big white *Calliotropis* species with a rather depressed, slightly cyrtoconoidal spire and an angular periphery, 2 granular spiral cords on first spire whorls and 5 granular spiral cords on last whorls; size of beads of cords decreasing in size from adapical part to abapical part; thin, crowded, strongly prosocline threads between cords; base more or less flat with 5 flat spiral cords; broad umbilicus with one thin spiral cord inside.

Description. *Shell* of rather big size for the genus (height up to 13.6 mm, width up to 19.2 mm), much broader than high, rather thin, slightly cyrtoconoidal; spire moderately depressed, height 0.6x to 0.7x width, 2.1x to 3.2x aperture height; broad umbilicus.
Protoconch damaged or strongly encrusted in all available specimens, estimated of about 350 µm.
Teleoconch up to 6.7 convex whorls, bearing 5 spiral granular cords different in size; nodules from cords produced on first whorls by intersections with axial ribs; axial sculpture on last whorls consisting in thin, crowed, strongly prosocline threads in area between spiral cords.
Suture visible, canaliculated.
First whorl convex, sculptured by about 15 slightly prosocline smooth, ribs; interspace between ribs from 1.5x to 2x broader than ribs; primary cord P3 appearing almost immediately; P2 appearing at mid whorl, weaker than P3. On second whorl, P2 and P3 stronger, beads of cords somewhat sharp. On third whorl, P1 appearing, quickly as strong as other cords; P2 closer to P1 than to P3; interspace between ribs from 2x to 2.5x broader than ribs; beads of cords similar in size. On fourth whorl, P1 dividing into two similar cords; beads of P3 slightly more numerous than those of other cords; P4 emerging partially from suture, beads much more smaller and more numerous than those of P3; primary axial sculpture becoming obsolete, crowded prosocline threads appearing in whole area between P3 and P4, some similar threads appearing between P2 and P3. On last whorls, P4 peripheral; beads of spiral cords decreasing in strength and size from adapical to abapical cord, crowded beads of P4 about 2x more numerous and smaller than those of P1; thin, prosocline threads present on the whole surface between all cords.
Aperture subelliptic, horizontally elongated; outer lip thin, meeting inner lip with an obtuse, poorly marked angle.
Columella more or less straight, oblique, without tooth.
Base almost flat, with 5 granular spiral cords, outermost cord the strongest, innermost cord stronger than other inner cords, bordering umbilicus; intermediate cords sometimes very obsolete; distance between cords decreasing from 2x size of cords for outer cords to 1x for inner cords; axial ribs between spiral cords very weak, giving to interspaces a smooth appearance.
Umbilicus very wide, diameter ca. 35% of shell width, deep, funnel shaped, with
steep sloping walls and one weak, subgranular spiral cord within.
Colour of teleoconch and protoconch light brown.

	TW	H	W	HA	H/W	H/HA
holotype	5.9	10.5	17.3	3.3	0.61	3.18
paratype MNHN	5.7	9.1	14.8	4.3	0.61	2.12
specimen CP1420	6.7	13.6	19.2	4.6	0.71	2.96

Table 24. - *Calliotropis keras* : Shells measurements in mm for types and some specimen.

Discussion. Considering thin, crowded axial threads on the whorls, *Calliotropis keras* n. sp. remembers *C. glypta* (Watson, 1879) (Figs 204-207) from Australia, but this species has a more elevated spire, a spiral cord P2 much more weaker than the other cords and more numerous spiral cords on the base.
The new species is also rather close to *C. derbiosa* Vilvens, 2004 (Figs 74-75) from Vanuatu and Fiji, but this bigger species has a much higher spire, stronger spiral cords on the base and no spiral cord inside the umbilicus.
Calliotropis keras n. sp. may be compared to *C. abyssicola* Rehder & Ladd, 1973 from central Pacific, but this species is not so depressed, has a more rounded periphery, more numerous, more concentrated spiral cords on the base towards the umbilicus and has no spiral cord inside the umbilicus.

Remarks. The specimen from Tonga has on last whorl an additional tertiary spiral cord between the divided in two parts P1 and P2.

Etymology. Horn (Greek : κερας), used as a noun in apposition - with reference to the conical shape of spire and and the funnel shaped umbilicus.

Calliotropis elephas n. sp.

Figs 242-245, Table 25

Type material. Holotype (7.4 x 12.1 mm) MNHN (9879). Paratypes : 30 MNHN (9880), 2 NMNZ (M.273553), 2 MZB (Gst. 13.639), 2 RMBR (ZRC.MOL.2770-2771), 2 C.Vilvens coll.

Type locality. BIOCAL, stn DW51, 23°05'S, 167°45'E, 680-700 m.

Material examined. New Caledonia. BIOCAL: stn CP23, 22°46'S, 166°20'E, 2040 m, 1 dd juv. - Stn DW33, 23°10'S, 167°10'E, 675-680 m, 2 dd sub. - Stn DW36, 23°09'S, 167°11'E, 650-680 m, 2 dd, 2 dd sub, 2 dd juv. - Stn stn CP40, 22°55'S, 167°24'E, 650 m, 1 dd, 1 dd juv. - Stn DW48, 23°00'S, 167°29'E, 775 m, 15 dd, 20 dd sub. - Stn DW51, 23°05'S, 167°45'E, 680-700 m, 60 lv (with holotype and paratypes), 9 lv sub, 20 dd juv. - Stn CP52, 23°06'S, 167°47'E, 540-600 m, 1 dd. - Stn KG85, 20°59'S, 167°00'E, 1639 m, 1 dd juv. - SMIB 3: stn DW24, 22°47'S, 167°12'E, 405 m, 1 dd. - SMIB 8: DW193-196, 22°52'S-23°S, 167°20'-168°22'E, 491-558 m, 1 dd. - Stn DW201, 23°59'S, 168°21'E, 500-504 m, 1 dd. - BATHUS 2: stn DW721, 22°54'S, 167°17'E, 525-547 m, 2 dd.

Distribution. New Caledonia, alive in 680-700 m , shells in 405-2040 m.

Diagnosis. A rather small, depressed, ivory white *Calliotropis* species with a slightly cyrtoconoidal spire, last whorls with shoulder under the suture, 2 granular, sharp spiral cords on spire whorls and 3 spiral cords on last whorl, adapical cord the strongest; base with 5 spiral cords, the 3 outermost always smooth; broad umbilicus without cord inside.

Description. *Shell* of moderate size for the genus (height up to 8.3 mm, width up to 13.7 mm), much broader than high, rather thin, slightly cyrtoconoidal; spire depressed, height from 0.6x to 0.7 width, 2.8x to 3.8x aperture height; broad umbilicus.

Protoconch of about 350 µm, of 1 whorl, glassy, dome shaped, without terminal varix.

Teleoconch up to 5.8 convex whorls with up to 2 granular spiral cords; nodules from cords produced by intersections with axial ribs on first whorls; axial sculpture visible on all whorls.

Suture visible, not canaliculated.

First whorl convex, sculptured by about 18 orthocline, rather thick, smooth ribs; interspace between ribs similar in size to ribs in first half of whorl, about 2x broader than ribs after mid whorl; primary cord P2 appearing almost immediately, quickly strong, with sharp beads. On second whorl, beads of P2 stronger and sharper; axial ribs thicker; interspace between ribs still 2x broader than ribs. On third whorl, P1 appearing after mid whorl, quickly almost as strong as P2; P3 emerging partially from suture with small beads; axial ribs weakly prosocline; axial ribs connecting beads of cords P1 and P2. On fourth whorl, P1 stronger than P2, both with sharp nodules well spaced; P1 making shoulder; beads of P1 vertically oriented; axial sculpture more prosocline. On last whorl, P1 the strongest, P3 the weakest, peripheral; beads of P2 more numerous than those of P1 (ratio of 3 beads of P2 for 2 beads of P1), beads of P3 more numerous than those of P2 (ratio of 5 beads of P3 for 2 beads of P2); axial ribs becoming obsolete; P1 may exceptionally split into two cords (see specimen SMIB 8: stn DW201).

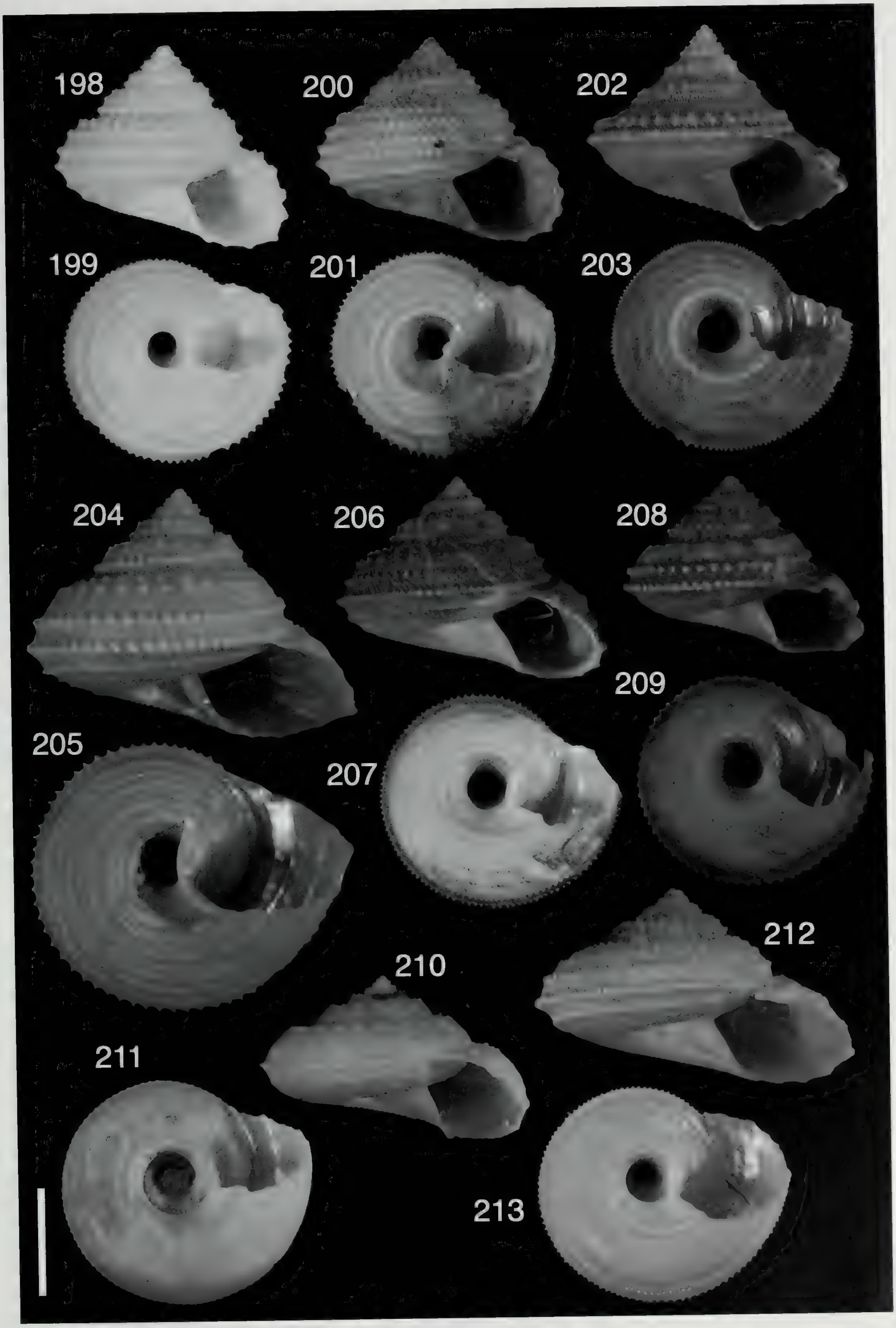
Aperture subelliptic, slightly inclined backward; outer lip thin, meeting inner lip with an obtuse, poorly marked angle.

Columella more or less straight, oblique, without tooth.

Base moderately convex, with 5 spiral cords; 3 outermost cords smooth, innermost cord granular, bordering umbilicus; intermediate cord smooth or subgranular; distance between cords from 1x to 1.5 size of cords; no axial threads between cords (only very thin growth lines).

Figures 198-213. Scale bar = 5 mm.

198-201. *Calliotropis blacki* Marshall, 1979.
  198-199. Holotype NMNZ (M226932), Raoul Island, Kermadec group, 11.3 x 13.0 mm; **200-201.** MNHN, New Caledonia, 720 m [MUSORSTOM 4: stn DC168], 11.3 x 13.1 mm.
202-203. *C. dicrous* n. sp., holotype MNHN (9853), Solomon Islands, 435-461 m [SALOMON 1, stn CP1858], 10.2 x 12.9 mm.
204-207. *C. glypta* (Watson, 1879).
  204-205. Australia, New South Wales, 440 m, C.Vilvens coll, 18 x 21.5 mm; **206-207.** Vanuatu, 778-811 m [MUSORSTOM 8: stn DW1128], 12.0 x 16.1 mm.
208-209. *C. boucheti* Poppe, Tagaro & Dekker, 2006, MNHN, Taiwan, South China Sea, 554 m [TAIWAN 2000: stn DW46], 9.6 x 13.2 mm.
210-211. *C. rostrum* n. sp., holotype MNHN (9881), New Caledonia, 650-658 m [BATHUS 3, stn CP831], 8.3 x 13.9 mm.
212-213. *C. keras* n. sp., holotype MNHN (9877), Fiji, 588-610 m [MUSORSTOM 10, stn CP1344], 10.5 x 17.3 mm.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Umbilicus wide, diameter ca. 35% of shell width, deep, funnel shaped, with gently sloping walls, without spiral cord inside.

Colour of teleoconch ivory white; protoconch translucid.

	TW	H	W	HA	H/W	H/HA
holotype	5.6	7.4	12.1	2.6	0.61	2.85
paratype MNHN 1	5.5	7.7	11.4	2.8	0.68	2.75
paratype MNHN 2	5.6	7.6	11.5	2.5	0.66	3.04
paratype MNHN 3	5.6	7.3	12.3	2.4	0.59	3.04
paratype MNHN 4	5.6	8.1	12.5	2.7	0.65	3.00
paratype MNHN 5	5.6	8.2	13.7	2.6	0.60	3.15
paratype MNHN 6	5.4	7.1	12.6	2.5	0.56	2.84
paratype MNHN 7	5.8	8.3	12.6	2.2	0.66	3.77
paratype MNHN 8	5.4	7.5	12.0	2.2	0.63	3.41

Table 25. - *Calliotropis elephas* : Shells measurements in mm for some types.

Discussion. *C. elephas* n. sp. is close to *C. concavospira* (Schepman, 1908) (Figs 246-247) from Indonesia, but this slightly smaller species has thinner spiral cords on the whorls with beads of P3 smaller and much more spaced, a rounded, not elongated, aperture, and thinner spiral cords on the base, all granular with thin axial threads between cords.

The new species is also rather close to *C. gemmulosa* (A.Adams, 1860) from Japan and Philippines, but this smaller species has a more elevated spire, 4 (not 3) spiral cords on the last whorl and 3 spiral cords on the base, all granular.

Regarding the number of cords, *C. elephas* n. sp. remembers *C. carinata* Jansen, 1994 (Figs 184-185) from eastern Australia, but this species has a more elevated spire, beads of P3 much more spaced, thinner, all granular spiral cords on the base with well spaced beads and numerous axial threads between cords.

The new species may be compared to *C. basileus* Vilvens, 2004 (Figs 76-79) from Fiji and New Caledonia, but this larger species has a more elevated spire, beads of P3 much more spaced and 4 (not 5) spiral cords on the base with a granular (not smooth) external cord.

Etymology. Ivory (Greek : ελεφας), used as a noun in apposition - with reference to the ivory whire colour of the shell.

Calliotropis rostrum n. sp.
Figs 210-211, Table 26

Type material. Holotype (8.3 x 13.9 mm) MNHN (9881). Paratypes : 2 MNHN (9882 & 9883).

Type locality. New Caledonia, BATHUS 3, stn CP831, 23°04'S, 166°56'E, 650-658 m.

Material examined. New Caledonia. BATHUS 3: stn DW809, 23°39'S, 167°59'E, 650-730 m, 1 dd (paratype 9883). - Stn CP831, 23°04'S, 166°56'E, 650-658 m, 2 dd (holotype and paratype 9882).
Coral Sea. MUSORSTOM 5: stn 313, 22°24'S 159°33'E, 780-930 m, 1 dd.

Distribution. South-western Pacific (New Caledonia and Coral Sea), 658-780 m.

Diagnosis. A whitish beige *Calliotropis* species of rather big size, with a cyrtoconoidal, moderately depressed spire, an rounded periphery and 2 granular spiral cords on whorls, the adapical one strong and the abapical one much more weaker, making keel, only visible on last whorls; base with 4 very weak spiral cords that are all poorly visible except the outermost and the innermost; very broad umbilicus without spiral cord inside.

Description. *Shell* of rather big size for the genus (height up to 8.7, width up to 16.2 mm), broader than high, thin, cyrtoconoidal; spire moderately depressed, height 0.5x to 0.6x width, 2.8x to 3.0x aperture height; very broad umbilicus.

Protoconch of about 270 µm, of 1 whorl, without terminal varix.

Teleoconch up to 6.1 convex whorls, bearing to 2 spiral granular cords different in size; nodules from cords produced by intersections with axial ribs; axial sculpture on first whorls, reduced to adapical part on last whorls.

Suture impressed, not canaliculated.

First whorl convex, sculptured by about 15 prosocline smooth ribs; interspace between ribs from 1.5x to 2x broader than ribs; primary cord P1 appearing immediately, granular. On second whorl, P1 stronger with sharp beads; interspace between ribs 2x broader than ribs. On third whorl, beads pointed, isolated, almost vertically oriented; P2 and P3 absent; P4 emerging weakly from suture at end of whorl or at begin of next whorl, granular, much weaker than P1; axial ribs becoming weaker. On next whorls, P1 with strong, well spaced nodules; beads of P4 from 3x to 4x more numerous than beads of P1; axial sculpture still visible in adapical part, near beads of P1. On last whorl, P4 peripheral, making keel; weak tertiary spiral cord in the middle of area between P1 and P4 on specimen from Coral Sea.

Aperture subcircular to subelliptic; outer lip very thin, without angle and meeting inner lip with a marked angle of about 120°.

Columella more or less straight, oblique, without tooth.

Base moderately convex, with 4 spiral cords, outermost cord always distinct but weaker than innermost cord bordering umbilicus; other cords undistinct; distance between cords from 3x to 4x size of cords; no axial ribs visible between spiral cords.

Umbilicus very wide, diameter measuring ca. 35% to 40% of shell width, deep, funnel shaped, with crowded, thin axial ribs and without spiral cord inside.

Colour of teleoconch beige; protoconch off white.

	TW	H	W	HA	H/W	H/HA
holotype	6.1	8.3	13.9	2.8	0.60	2.96
paratype MNHN CP831	5.5	6.7	11.6	2.3	0.58	2.91
paratype MNHN DW809	5.9	8.7	16.2	3.1	0.54	2.81

Table 26. - *Calliotropis rostrum* : Shells measurements in mm for types.

Discussion. The combination of a depressed spire and a large smooth area between P1 and P4 avoids any confusion with any known *Calliotropis* species. The closer one could be *C. bicarinata* (Schepman, 1908) (Figs 218-219) from Indonesia but this smaller species has a more elevated spire, a thick, scaly spiral cord P3, a spiral cord P4 thicker than the one of the new species and 3 thick spiral cords on the base.

Etymology. Ram of an ancient warship (Latin), used as a noun in apposition - with reference to the shape of the last whorl with a prominent peripheral spiral cord.

Calliotropis nomisma n. sp.

Figs 236-237, Table 27

Type material. Holotype (9.7 x 17.6 mm) MNHN (9884). Paratypes : 7 MNHN (9885), 2 MZB (Gst. 13.640), 2 RMBR (ZRC.MOL.2772-2773), 1 C.Vilvens coll.

Type locality. Indonesia, KARUBAR, stn CP69, 08°42'S, 131°53'E, 356-368 m.

Material examined. Indonesia. KARUBAR: stn CP59, 08°20'S, 132°11'E, 399-405 m, 1 dd. - Stn CP69, 08°42'S, 131°53'E, 356-368 m, 16 dd (with holotype and paratypes).

Distribution. Indonesia, 368-399 m.

Diagnosis. A pearly grey *Calliotropis* species of medium size, with a slightly cyrtoconoidal, depressed spire, an angulated periphery and up to 3 granular spiral cords on whorls, the intermediate cord disappearing on last whorls while the abapical cord grows; abapical cord making a strong keel on last whorl; base smooth except 1 (or sometimes 2) granular spiral cord around umbilicus; one basal columallar tooth; broad umbilicus without spiral cord inside.

Description. *Shell* of medium size for the genus (height up to 10.2 mm, width up to 18.1mm),
much broader than high, slightly cyrtoconoidal; spire depressed, height from 0.5x to 0.6x width, 3.5x to 3.8x aperture height; broad umbilicus.

Protoconch of about 350 µm, of 1 whorl, without terminal varix.

Teleoconch up to 6.3 moderately convex whorls, bearing 2 spiral granular cords different in size on first whorls, 3 cords on intermediate whorls and 2 cords on last whorls; primary axial sculpture only visible on first whorls.

Suture impressed, canaliculated.

First whorl convex, sculptured by about 15 orthocline smooth ribs; interspace between ribs from 1.5x to quickly 2.5x broader than ribs; primary cords P1 and P3 appearing almost immediately, granular; nodules from cords produced by intersections with axial ribs; P3 slightly stronger than P1. On second whorl, beads of both cords stronger, beads of P3 sharper than those of P1; axial ribs slighlty prosocline, broader but lower. On third whorl, P4 emerging partially from suture at end of whorl, granular; beads of P4 smaller and more numerous than nodules of P3; P2 absent; axial ribs vanishing. On fourth whorl, P3 weakening and P4 fully emerging from suture, becoming stronger than P3; bead of P4 smaller than those of P1, bluntly sharp, scaly. On next whorls, beads of P1 thick, sharp, almost vertically oriented; bead of P4 2x to 3x more numerous than those of P1; P3 disappearing. On last whorl, P4 peripheral, making keel; beads of P4 crowed, vertically elongated.

Aperture subquadrangular; outer lip thin, with an median angle corresponding to exterior P4 and meeting inner lip with an angle of about 120°.

Columella curved at first third, oblique, with 1 basal tooth, expanding into umbilicus.

Base moderately convex, smooth except 1 granular spiral cord around umbilicus; on some specimens, an additional thin spiral cord bordering main cord.

Umbilicus wide, diameter ca. 35% of shell width, deep, funnel shaped, with steep sloping walls, undistinct crowded thin axial ribs and without spiral cord inside.

Colour of teleoconch and protoconch pearly grey.

	TW	H	W	HA	H/W	H/HA
holotype	6.3	9.7	17.6	2.8	0.55	3.46
paratype MNHN 1	6.2	10.1	17.8	2.7	0.57	3.74
paratype MNHN 2	5.8	9.1	17.7	2.4	0.51	3.79
paratype MNHN 3	6.0	10.2	18.0	2.7	0.57	3.78
paratype MNHN 4	6.2	9.7	18.1	2.7	0.54	3.59

Table 27. - *Calliotropis nomisma* : Shells measurements in mm for largest types.

Discussion. Regarding the peculiar ontogeny of cords (especially of P3), the new species remembers only *Calliotropis midwayensis* (Lan, 1990) (Figs 88-95) from Midway Islands and Taiwan, but this species has a more elevated spire, more convex whorls and 6 or 7 thin spiral cords on the base.

Regarding the general shape of the shell, *C. nomisma* n. sp. is rather close to *Basilissa sibogae* Schepman, 1908 from Indonesia, but this species is smaller for a similar number of whorls, has a much more elevated spire and a numerous spiral cords on the whole base.

Etymology. Medal (Greek : νομισμα), used as a noun in apposition - with reference to the depressed shape of the shell.

Calliotropis bucina Vilvens, 2006
Figs 106-107

Calliotropis bucina Vilvens, 2006: 62-66, figs. 30-35. Type locality: Reunion Island, 20°51'S, 55°36'E, 280-340 m.

Material examined. Solomon Islands. SALOMON 1: DW1768, 8°21.4'S, 160°41.8'E, 513-564 m, 21 dd. - Stn DW1820, 9°52.3'S, 160°51.4'E, 256-329 m, 1 dd. - Stn DW1834, 10°12.2'S, 161°17.8'E, 225-281 m, 4 dd.

Indonesia. KARUBAR: stn DW31, 05°40'S, 132°51'E, 288-289 m, 1 dd.

Distribution. Réunion Island, 270-310 m; Mayotte Island, 300-350 m (Vilvens, 2006); Solomon Islands, 281-513 m; Indonesia, 295-417 m.

Remarks. This species was originally described from south-western Indian Ocean. One can wonder about these new records in Pacific, in two different areas, very far from the type locality and giving thus a disjoint distribution in three segments. Nevertheless, the specimens here examined are similar to the types and match the original description, except that they seem a little more depressed and that S2 appears a bit later. *C. bucina* Vilvens, 2006 is rather close to *C. sagarinoi* Poppe, Tagaro & Dekker, 2006 from Philippines, but this species has a less depressed spire, lacks the spiral cord S2, has only 2 (instead of 3) spiral cords on the base and has no spiral cord inside the umbilicus.

Calliotropis stegos n. sp.
Figs 180-183, Table 28

Type material. Holotype (4.7 x 7.1 mm) MNHN (9886). Paratypes : 8 MNHN (9887), 2 NMNZ (M.273554), 1 C.Vilvens coll.

Type locality. Solomon Islands, SALOMON 1, stn CP1798, 9°21.0'S, 160°29.2'E, 513-564 m.

Material examined. Solomon Islands. SALOMON 1: stn CP1749, 9°20.9'S, 159°56.2'E, 582-594 m, 3 dd, 1 dd juv. - Stn CP1750, 9°15.6'S, 159°54.6'E, 693-696 m, 1 dd, 1 dd juv. - Stn CP1751, 9°10.4'S, 159°53'E, 749-799 m, 1 dd. - Stn DW1793, 9°13.4'S, 160°07.8'E, 505-510 m, 1 dd. - Stn DW1795, 9°18.8'S, 160°22.9'E, 442-451 m, 1 dd. - Stn CP1796, 9°19.2'S, 160°25.4'E, 469-481 m, 2 dd. - Stn CP1798, 9°21.0'S, 160°29.2'E, 513-564 m, 10 lv (holotype and paratypes). - Stn CP1805, 9°35.0'S, 160°42.7'E, 367-500 m, 1 dd. - Stn CP1806, 9°37.0'S, 160°49.7'E, 621-708 m, 1 dd. - Stn CP1808, 9°45.5'S, 160°52.5'E, 611-636 m, 15 dd, 5 dd juv. - Stn CP1858, 9°37.0'S, 160°41.7'E, 435-461 m, 1 dd, 1 dd juv.

Distribution. Solomon Islands, alive in 513-564 m, shells in 451-749 m.

Diagnosis. A rather small *Calliotropis* species with a rather depressed, cyrtoconoidal spire, rather broad protoconch and weakly convex whorls, light brownish, with 2 main granular spiral cords on spire whorls and 3 granular spiral cords on last whorl, the abapical cord peripheral; base with 5 to 7 granular spiral cords; broad umbilicus without spiral cord inside.

Description. *Shell* of moderate size for the genus (height up to 5.0 mm, width up to 7.3 mm), broader than high, rather thin, cyrtoconoidal; spire moderately elevated, height 0.5x to 0.7x width, 3.9x to 4.3x aperture height; broad umbilicus.

Protoconch from 350 to 360 µm, of about 1 whorl, dome shaped, without clearly visible terminal varix.

Teleoconch up to 4.9 convex whorls, bearing 2 spiral granular cords on spire, 3 on last whorl; nodules from cords produced by intersections with axial ribs; axial sculpture visible on first whorls, obsolete on last whorls.

Suture impressed, canaliculated.

First whorl convex, sculptured by 14 to 15 orthocline, smooth, rather thick ribs; interspace between ribs 2x to 2.5x broader than ribs; primary spiral cords P1 and P2 appearing almost immediately, similar in size. On second whorl, P2 weakly stronger than P1. On third whorl, P2 moving towards middle of whorl, much stronger than P1; beads of both cords sharp; axial ribs weak. On last whorls, P1 and P2 similar in strength, with sharp, spaced beads; P2 median; axial ribs obsolete except near beads of cords. On last whorl, P3 visible, peripheral, with beads weaker, slightly more numerous and more closely packed than those of P1 and P2.

Aperture subquadrate; outer lip thin, meeting inner lip with an obtuse, marked angle.

Columella more or less straight, oblique, without tooth.

Base convex, with 5 to 7 granular spiral cords, of various size but with innermost cord slightly stronger, bordering umbilicus; distance between successive cords similar in size of stronger cord; axial ribs between spiral cords, connecting beads of all cords.

Umbilicus broad, diameter ca. 30% of shell width, deep, funnel shaped, with gently sloping walls, with strong axial ribs, without spiral cord inside except for very large specimens where a very thin spiral cord may be present (e.g. SALOMON 1, stn CP1749).

Colour of teleoconch light brown; protoconch glassy white.

	TW	H	W	HA	H/W	H/HA
holotype	4.8	4.7	7.1	1.1	0.66	4.27
paratype MNHN 1	4.9	4.8	7.1	1.3	0.68	3.69
paratype MNHN 2	4.8	5.0	7.3	1.3	0.68	3.85
paratype MNHN 3	4.5	4.1	6.3	1.1	0.65	3.73
paratype MNHN 4	4.6	4.7	6.9	1.2	0.68	3.92
paratype MNHN 5	4.6	4.3	6.1	1.2	0.70	3.58
paratype MNHN 6	4.4	3.8	7.0	1.3	0.54	2.92
paratype NMNZ 1	4.6	4.5	6.7	1.3	0.67	3.46
paratype NMNZ 2	4.4	3.7	5.9	1.2	0.63	3.08
paratype MNHN CV	4.7	4.3	6.6	1.3	0.65	3.31

Table 28. - *Calliotropis stegos* : Shells measurements in mm for types.

Discussion. *Calliotropis stegos* n. sp. is rather close to *C. hysterea* n. sp. (Figs 134-137) from New Caledonia, but the latter has an almost conical shape, beads of P2 thicker and more spaced, a bigger protoconch and a secondary cord S1.

The new species is superficially similar to *C. scalaris* Lee & Wu, 2001 (Figs 116-119) from South China Sea and Indonesia, but this slightly larger species has a more globular shape with a less H/W ratio and stronger nodules of P1 and P2.

Regarding the number of spiral cords on the whorls, the new species weakly remembers *C. francocacii* Poppe, Tagaro & Dekker, 2006 from Philippines, but this similar in size species has a more elevated spire, thicker nodules on the spiral cords P1 and P2, a rounded periphery and only 5 thinner spiral cords on the base.

Also considering the number of spiral cords, *C. stegos* n. sp. may be compared to *C. wilsi* Poppe, Tagaro & Dekker, 2006 from Philippines, but this species has a more elevated, slightly coeloconoidal spire, a significant keel on P2, much thicker, more spaced nodules on all the spiral cords and only at most 5 spiral cords on the base.

Etymology. Urn (Greek : στεγος), used as a noun in apposition - with reference to the shape of the shell.

Calliotropis cooperculum n. sp.

Figs 190-193, Table 29

Type material. Holotype (5.0 x 7.4 mm) MNHN (9888). Paratypes : 4 MNHN (9889), 1 C.Vilvens coll.

Type locality. Fiji, BORDAU 1, stn DW1485, 19°03'S, 178°30'W, 700-707 m.

Material examined. Fiji. BORDAU 1: stn DW1413, 16°10'S, 179°24'W, 669-676 m., 1 dd. - Stn DW1485, 19°03'S, 178°30'W, 700-707 m, 6 dd, 4 dd sub (with holotype and paratypes). - Stn DW1488, 19°01'S, 178°25'W, 500-516 m, 1 dd. - Stn CP1490, 18°51'S, 178°32'W, 785-820 m, 4 dd.

Distribution. Fiji, 516-785 m.

Diagnosis. A small nacreous white *Calliotropis* species with a rather depressed, slightly coeloconoidal spire, 2 granular spiral cords on spire whorls and 4 more or less spiny, different in size, spiral cords on last whorl; base with 6 thin spiral cords; broad umbilicus with one thin spiral cord inside.

Description. *Shell* of small size for the genus (height up to 5.0 mm, width up to 7.4 mm), much broader than high, rather thin, slightly coeloconoidal; spire rather depressed, height 0.6x to 0.7x width, 3.6x to 5.0x aperture height; broad umbilicus.

Protoconch of about 350 µm, of 1 whorl, glassy, bulbous, without clearly visible terminal varix.

Teleoconch up to 5 convex whorls, bearing up to 4 spiral granular cords different in size; nodules from cords produced by intersections with axial ribs; axial sculpture weakly visible on last whorl near nodules of spiral cords.

Suture visible, canaliculated.

First whorl convex, sculptured by about 15 prosocline, smooth ribs; ribs first rather thin, with interspace between ribs about 2x broader than ribs; after mid whorl, ribs much thicker, interspace between ribs at least 3x broader than ribs; primary cords P1 and P2 appearing almost immediately, weak but distinct, similar in size. On second whorl, P1 and P2 stronger, beads of cords bluntly sharp. On third whorl, pointed beads of P2 oriented at 45°, sharp beads of P1 almost vertically oriented; P3 emerging weakly from suture at end of whorl, granular, much weaker than P1 and P2. On fourth whorl, P1 slightly stronger than P2, both with sharp nodules well spaced; axial sculpture becoming obsolete except near beads. S1 appearing at end of fourth whorl or at begin of fifth, very thin, weakly granular. On fifth whorl, P1 stronger than P2, nodules of P2 from 1.5x to 2x more numerous than those of P1; P3 peripheral, with sharp beads horizontally oriented, twice more numerous than those of P2; beads of S1 sharp after mid whorl, almost similar to beads of P1 and P2 at end of whorl.

Aperture subelliptic; outer lip thin, meeting inner lip with an obtuse, marked angle.

Columella more or less straight, oblique, without tooth.

Base almost flat, with 6 thin granular spiral cords, innermost cord stronger, bordering umbilicus; distance between 5 outermost cords about 2x size of cords; axial ribs between spiral cords, connecting beads of all cords, distance between ribs similar in size to ribs.

Umbilicus very wide, diameter ca. 35% of shell width, deep, funnel shaped, with rather strong axial ribs and a very weak (sometimes even absent) spiral cord inside.

Colour of teleoconch and protoconch nacreous white.

Figures 214-235. Scale bar = 5 mm.

214-217. *Calliotropis ostrideslithos* n. sp., Solomon Islands, 453-542 m [SALOMON 1, stn CP1770].
  214-215. Holotype MNHN (9894), 3.8 x 6.5 mm; **216-217.** Paratype MNHN (9895), 3.3 x 5.8 mm.

218-219. *C. bicarinata* (Schepman, 1908), holotype ZMA (3.08.059), Indonesia, 390 m [SIBOGA, stn 59], 4.0 x 6.0 mm.

220-221. *C. trieres* n. sp., holotype MNHN (9890), New Caledonia, 380-400 m [BATHUS 1, stn DW683], 2.9 x 4.3 mm.

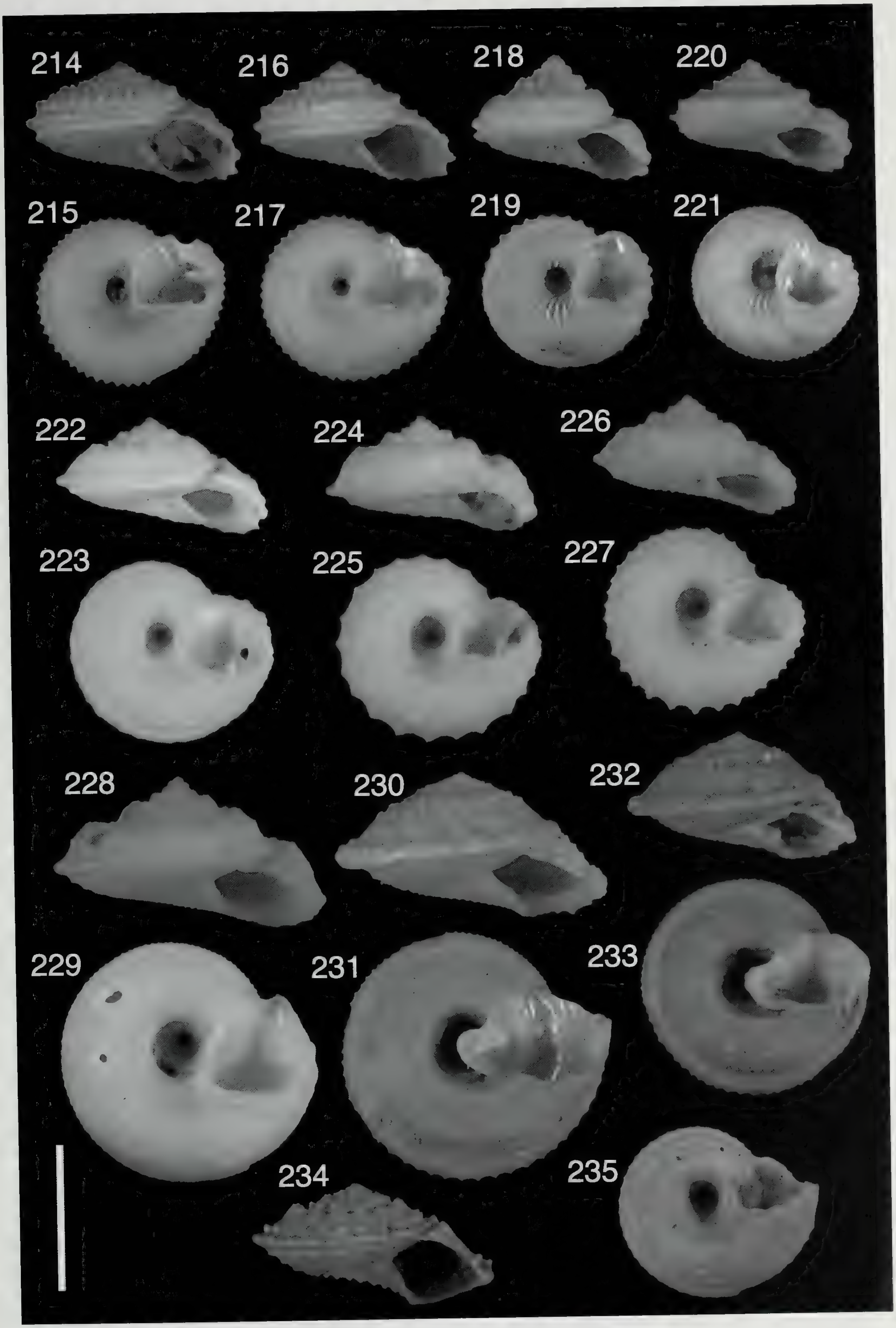
222-223. *C. vilvensi* Poppe, Tagaro & Dekker, 2006, MNHN, Solomon Islands, 396-411 m [SALOMON 1, stn DW1762], 2.7 x 4.4 mm.

224-227. *C. pheidole* n. sp.
  224-225. Holotype MNHN (9898), Fiji, 500-516 m [BORDAU 1, stn DW1488], 2.6 x 4.8 mm; **226-227.** MNHN, Tonga, 482-504 m [BORDAU 2, DW1615], 3.1 x 5.1 mm.

228-229. *C. siphaios* n. sp., holotype MNHN (9892), Tonga, 500 m [BORDAU 2, DW1549], 5.2 x 8.5 mm.

230-233. *C. nomismasimilis* n. sp.
  230-231. Holotype MNHN (9896), Solomon Islands, 387 m [SALOMON 1, stn CP1786], 5.2 x 9.1 mm;
  232-233. MNHN, Solomon Islands, 381-383 m [SALOMON1, cp1837], 4.6 x 8.2 mm.

234-235. *C. spinulosa* (Schepman, 1908), syntype ZMA (3.08.058), Indonesia, 411 m [SIBOGA, stn 159], 4.3 x 8.8 m.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	TW	H	W	HA	H/W	H/HA
holotype	5.0	5.0	7.4	1.0	0.68	5.00
paratype MNHN 1	5.0	4.9	7.2	1.1	0.68	4.45
paratype MNHN 2	4.8	4.2	6.6	1.1	0.64	3.82
paratype MNHN 3	4.9	4.1	6.6	1.1	0.62	3.73
paratype MNHN 4	4.9	4.5	6.6	1.1	0.68	4.09
paratype MNHN CV	4.7	4.3	6.3	1.2	0.68	3.58

Table 29. - *Calliotropis cooperculum* : Shells measurements in mm for types.

Discussion. *Calliotropis cooperculum* n. sp. shares a similar ontogeny of cords with *C. hysterea* n. sp. (Figs 134-137) from New Caledonia, but this similar in size species has a much higher spire, a conical shape, P1 and P2 similar in size and thicker, and more distinct basal spiral cords.

The new species is also rather close to *C. gemmulosa* (A.Adams, 1860) from Japan and Philippines, but, again, this similar in size species has a higher spire and spiral cords on whorls that are similar in size; moreover, the new species has thicker and fewer (only 3 or 4) basal spiral cords.

C. cooperculum n. sp. may be compared to *C. abyssicola* Rehder & Ladd, 1973 from central Pacific, but this species is taller for a same number of whorls, has a cyrtoconoidal shape and similar in size spiral cords on the whorls.

The new species may also be compared to some forms of the variable *C. calatha* (Dall, 1927) from western Atlantic, but this more or less similar in size species has a more elevated spire and only 3 or 4 spiral cords on the base.

Etymology. Cover (Latin), used as a noun in apposition - after the shape of the spire of the shell remembering the cover of a pan.

Calliotropis trieres n. sp.

Figs 220-221, Table 30

Type material. Holotype (2.9 x 4.3 mm) MNHN (9890). Paratypes : 8 MNHN (9891), 2 NMNZ (M.273555), 1 C.Vilvens coll.

Type locality. New Caledonia, BATHUS 1, stn DW683, 20°35'S, 165°07'E, 380-400 m.

Material examined. New Caledonia. BATHUS 1: stn DW683, 20°35'S, 165°07'E, 380-400 m, 24 dd (with holotype and paratypes), 8 dd juv. - BATHUS 3: stn DW838, 23°01'S, 166°56'E, 400-402 m, 1 dd.

Distribution. New Caledonia, 400 m.

Diagnosis. A small, depressed, nacreous white *Calliotropis* species with a more or less conical spire, a small protoconch, 2 granular spiral cords on spire whorls, the adapical with sharp beads and the other making a keel; an additional peripheral spiral cord on last whorl giving a bicarinate shape to the shell; base with 4 granular spiral cords; broad umbilicus with one spiral cord inside.

Description. *Shell* of small size for the genus (height up to 2.9 mm, width up to 4.5 mm), much broader than high, rather thin, conical to slightly cyrtoconoidal; spire depressed, height from 0.6x to 0.7x width, 3.0x to 4.3x aperture height; broad umbilicus.

Protoconch from 200 to 250 µm, of 1 whorl, glassy, without terminal varix.

Teleoconch up to 4.5 slightly convex whorls, bearing up to 3 spiral granular cords; nodules from cords produced by intersections with axial ribs on first whorls; axial sculpture on spire whorls, weaker on last whorl.

Suture visible, canaliculated.

First whorl convex, sculptured by about 15 weakly prosocline smooth ribs; interspace between ribs about 2x broader than ribs; primary cord P3 appearing almost immediately, P1 appearing half a whorl later, weaker than p3. On second whorl, P3 stronger than P1; beads of P3 strong and sharp. On third whorl, beads of P1 and P3 sharp, beads of P1 1.5x more numerous than beads of P3; beads of P1 almost vertically oriented; area between P1 and P3 more or less straight, P3 making keel; axial ribs stil connecting beads of cords, but becoming weaker. On fourth whorl, P4 emerging weakly from suture, granular, with beads smaller than beads of P1; P2 absent; axial sculpture obsolete. On last whorl, P4 peripheral, making a second keel, with beads slightly smaller and more numerous than those of P3; P3 more or less median between P1 and P4.

Aperture subcircular, inclined backward; outer lip thin, meeting inner lip without angle; inner lip flanged in a curving arc covering about a quarter of umbilicus.

Columella almost straignt, oblique, without tooth.

Base moderately convex, with 4 granular spiral cords; distance between cords similar in size to cords; weak, low axial ribs between spiral cords, connecting beads of all cords, distance between ribs similar in size to ribs.

Umbilicus wide, diameter measuring ca. 30% of shell width, deep, funnel shaped, with gently sloping walls; strong, lamellose, widely spaced, axial ribs and 1 granular spiral cord inside.
Colour of teleoconch nacreous white; protoconch translucid.

	TW	H	W	HA	H/W	H/HA
holotype	4.5	2.9	4.3	0.7	0.67	4.14
paratype MNHN 1	4.4	2.6	4.5	0.6	0.58	4.33
paratype MNHN 2	4.4	2.8	4.0	0.7	0.70	4.00
paratype MNHN 3	4.3	2.5	4.1	0.7	0.61	3.57
paratype MNHN 4	4.1	2.4	4.1	0.7	0.59	3.43
paratype MNHN 5	4.3	2.4	3.8	0.7	0.63	3.43
paratype NMNZ 1	4.1	2.4	3.9	0.8	0.62	2.67

Table 30. - *Calliotropis trieres* : Shells measurements in mm for largest types.

Discussion. *Calliotropis trieres* n. sp. is rather close to *C. ostrideslithos* n. sp. (Figs 214-217) from Solomon Islands, but this slightly broader species has a larger protococonch, stronger beads on P3, 3 spiral cords and thinner, more crowded axial threads within the umbilicus.
The new species may also remember *C. cooperculum* n. sp. (Figs 190-193) from Fiji, but this larger species has a larger protococonch, stronger and sharper beads on P1, no keel at P3, a concave (not straight) area between P1 and P3 and a not inclined aperture.
C. trieres n. sp. is may be compared to *C. carinata* Jansen, 1994 (Figs 184-185) from Eastern Australia, but this larger species has a more elevated spire, much thinner spiral cors ont the whorls and has no spiral cors within the umbilicus.

Etymology. Ancient trireme (Greek : τριηρης), used as a noun in apposition - with reference to the keeled shape of the shell, remembering the shape of ancient warships.

Calliotropis vilvensi Poppe, Tagaro & Dekker, 2006
Figs 222-223

Calliotropis vilvensi Poppe, Tagaro & Dekker, 2006: 61, pl. 24, fig. 2-3. Type locality: Philippines, Balicasag, 9°28.6'N, 123°40'E, 470-566 m.

Material examined. Solomon Islands. SALOMON 1: stn DW1741, 11°29.1'S, 159°57.4'E, 557-655 m, 1 dd. - Stn DW1762, 8°39.9'S, 160°03.9'E, 396-411 m, 2 dd. - Stn DW1825, 9°50.5'S, 160°58.0'E, 340-391 m, 2 dd. - Stn DW1835, 10°10.2'S, 161°23.5'E, 464-482 m, 1 dd.
Indonesia. KARUBAR: stn DW03, 05°48'S, 132°13'E, 278-301 m, 1 dd & 1 dd sub.
New Caledonia. BIOCAL: stn DW77, 22°15'S, 167°15'E, 680-700 m, 3 dd.

Distribution. Philippines, 470-566 m (Poppe et al., 2006); Indonesia, 680-700 m; south-western Pacific (from Solomon Islands to New Caledonia), 391-680 m.

Remarks. The specimens of these new records match perfectly the original description of this Philippine species, giving to it a wide but disjoint distribution. Additionnal new material will maybe fill the gaps betweens the different parts. See discussion under *C. pheidole* n. sp.

Calliotropis siphaios n. sp.
Figs 228-229, Table 31

Type material. Holotype (5.2 x 8.5 mm) MNHN (9892). Paratypes : 2 MNHN (9893).

Type locality. Tonga, BORDAU 2, DW1549, 20°38'S, 175°00'W, 500 m.

Material examined. Tonga. BORDAU 2: DW1549, 20°38'S, 175°00'W, 500 m, 4 dd (with holotype and paratypes), 4 dd sub. - Stn DW1520, 21°25'S, 175°03'W, 447-450 m, 1 dd. -
Fiji. BORDAU 1: stn DW1486, 19°01'S, 178°26'W, 395-540 m, 2 dd, 2 dd sub. - Stn DW1488, 19°01'S, 178°25'W, 500-516 m, 1 dd.

Distribution. South-western Pacific (from Fiji to Tonga), 450-500 m.

Diagnosis. A whitish ochre *Calliotropis* species of medium size, with a slightly cyrtoconoidal, depressed spire, an angulated periphery and up to 3 granular spiral cords on whorls, the abapical cord producing a strong keel; base with at least 5 spiral cords; broad umbilicus without spiral cord inside.

Description. *Shell* of small size for the genus (height up to 5.2, width up to 8.5 mm), much broader than high, slightly cyrtoconoidal; spire depressed, height about 0.6x width, 3.4x to 5.8x aperture height; broad umbilicus.

Protoconch from 250 to 300 µm, of 1 whorl, without terminal varix.
Teleoconch up to 4.9 moderately convex whorls, bearing 2 main spiral granular cords different in size and a secondary cord between them on last whorls; primary axial sculpture visible on all whorls; secondary axial sculpture in abapical area of last whorl.
Suture impressed, weakly canaliculated.
First whorl convex, sculptured by about 18 prosocline smooth ribs; interspace between ribs about 1.5x broader than ribs; primary cord P1 appearing immediately, granular. On second whorl, P1 much stronger, with bluntly sharp beads; interspace between ribs 2.5x broader than ribs. On third whorl, beads of P1 stronger and sharper, with large interspace between them; P1 making shoulder; axial ribs stronger near nodules; P4 emerging from suture at end of whorl, granular; beads of P4 a smaller and more numerous than nodules of P1; P2 and P3 absent. On fourth whorl, S1 appearing at same distance from P1 and P4, weak, granular; axial ribs more prosocline; strongly prosocline secondary axial ribs appearing in abapical part. On last whorl, P4 peripheral, making keel; beads of P4 vertically elongated, 4x more numerous than those of P1.
Aperture subquadrangular; outer lip rather thin, with an abapical angulation and meeting inner lip without angle or with an obtuse, poorly marked angle.
Columella curved, oblique, without tooth.
Base almost flat to slightly convex, with 5 granular spiral cords, sometimes with 1 or 2 thin additional cords; distance between cords of about 1.5x size of cords; thin threads between spiral cords, connecting beads of cords.
Umbilicus wide, diameter ca. 35% of shell width, deep, funnel shaped, with moderately steep sloping walls, widely spaced axial ribs and without spiral cord inside.
Colour of teleoconch whitish ochre; protoconch white.

	TW	H	W	HA	H/W	H/HA
holotype	4.9	5.2	8.5	0.9	0.61	5.78
paratype MNHN 1	4.8	4.4	8.0	1.3	0.55	3.38
paratype MNHN 2	4.7	4.0	6.5	1.1	0.62	3.64

Table 31. - *Calliotropis siphaios* : Shells measurements in mm for types.

Discussion. The new species is close to *Calliotropis vilvensi* Poppe, Tagaro & Dekker, 2006 (Figs 222-223) from the Philippines and *C. pheidole* n. sp. (Figs 224-227) from Fiji and Tonga, but these two smaller species have less numerous spiral cords on the base (4 at most) and at least 2 spiral cords inside the umbilicus.
C. siphaios n. sp. remembers *C. eucheloides* Marshall, 1979 (Figs 138-155, 160-161) from Kermadec Islands, New Caledonia and Philippines, but this slightly larger species differs by many features as a more elevated spire, more numerous spiral cords on the whorls and a columellar tooth.

Etymology. Buckwheat pancake (Greek : σιφαιος), used as a noun in apposition - with reference to the depressed spire of the shell.

Calliotropis calcarata (Schepman, 1908)
Figs 156-157, 162-167

Solariellopsis calcarata Schepman, 1908: 53-54, pl. IV, fig. 2., pl. IX, fig. 10. Type locality: South-eastern Indonesia, 10°27.9'S, 123°28.7'E, 216 m.
Other reference :
Calliotropis calcarata - Poppe, Tagaro & Dekker, 2006: 63, pl. 26, fig. 2.

Material examined. Indonesia. KARUBAR: stn DW15, 05°17'S, 132°41'E, 212-221 m, 3 dd. - Stn DW64, 09°13'S, 131°31'E, 179-180 m, 1 dd. - Stn CP85, 09°22'S, 131°14'E, 240-245 m, 1 dd.
Solomon Islands. SALOMON 1: stn DW1768, 8°21.4'S, 160°41.8'E, 194-286 m, 1 dd. - Stn DW1855, 9°46.4'S, 160°52.9'E, 252-263 m, 1 dd.

Distribution. Indonesia, 180-240 m (range computed using also data of Schepman, 1908) and Philippines, 150-210 m (Poppe, 2006).

Remarks. This species was described from Indonesia and the records in Solomon Islands are new. Poppe et al. also found this species in Philippines (2006). This species seems to have a rather wide distribution, provisionally disjoint.

Calliotropis ostrideslithos n. sp.
Figs 214-217, Table 32

Type material. Holotype (3.8 x 6.5 mm) MNHN (9894). Paratypes : 4 MNHN (9895), 1 C.Vilvens coll.

Type locality. Solomon Islands, SALOMON 1, stn CP1770, 8°19.6'S, 160°38.7'E, 453-542 m.

Material examined. Solomon Islands. SALOMON 1: stn CP1751, 9°10.4'S, 159°53'E, 749-799 m, 5 dd. - Stn CP1770, 8°19.6'S, 160°38.7'E, 453-542 m, 19 lv (with holotype and paratypes), 3 dd juv.

Distribution. Solomon Islands, alive in 453-542 m, shells in 542-749 m.

Diagnosis. A small, depressed, off-white *Calliotropis* species with a slightly cyrtoconoidal spire, 2 granular, sharp spiral cords on spire whorls and 4 or 5 different in size spiral cords on last whorl; base with 5 granular spiral cords; broad umbilicus with 3 thin spiral cords inside.

Description. *Shell* of small size for the genus (height up to 3.8 mm, width up to 6.5 mm), much broader than high, rather thin, slightly cyrtoconoidal; spire rather depressed, height about 0.6x width, 3.4x to 4.1x aperture height; broad umbilicus.

Protoconch of about 300 µm, of 1 whorl, glassy, without clearly visible terminal varix.

Teleoconch up to 4.7 convex whorls, bearing up to 4, sometimes 5, different in size spiral granular cords; nodules from cords produced by intersections with axial ribs on first whorls; axial sculpture weakly visible on last whorl near nodules of spiral cords.

Suture visible, canaliculated.

First whorl convex, sculptured by about 20 prosocline smooth ribs; interspace between ribs about 1.5x broader than ribs; primary cords P1 and P3 appearing almost immediately, weak but distinct, similar in size. On second whorl, P1 and P3 stronger; beads rounded, connected by axial ribs; interspace between ribs 2x broader than ribs. On third whorl, P3 stronger than P1; beads of P1 and P3 sharp, beads of P3 oriented at 45°, beads of P1 almost vertically oriented; P4 emerging clearly from suture at begin of whorl, granular, similar in size to P3; P2 absent; axial ribs connecting beads of P3 and P4, but connecting no more those of P1 and P3. On fourth whorl, P1 as strong as P3, both with sharp nodules well spaced; S1 appearing, weaker than P1 and P3; beads of P4 more numerous thant those of P3 (ratio of 3 beads of P3 for 4 beads of P4); axial sculpture obsolete except near beads. On last whorl, P4 peripheral; a tertiary spiral cord may appear between S1 and P3.

Aperture subelliptic, horizontally elongated; outer lip thin, meeting inner lip with an obtuse, poorly marked angle; inner lip flanged in a curving arc covering about a quarter of umbilicus.

Columella curved at first third, oblique, without tooth.

Base moderately convex, with 4 main granular spiral cords, a fifth weaker cord often present between two outermost cords; distance between cords more or less similar in size to cords; weak, low axial ribs between spiral cords, connecting beads of all cords, distance between ribs from 1x to 1.5 size of ribs.

Umbilicus wide, diameter ca. 35% of shell width, deep, funnel shaped, with gently sloping walls, thin axial ribs and 3 weak, granular spiral cords inside.

Colour of teleoconch and protoconch nacreous off-white.

	TW	H	W	HA	H/W	H/HA
holotype	4.7	3.8	6.5	1.1	0.58	3.45
paratype MNHN 1	4.4	3.3	5.8	0.9	0.57	3.67
paratype MNHN 2	4.4	3.3	6	0.8	0.55	4.13
paratype MNHN 3	4.4	3.1	5.6	0.9	0.55	3.44
paratype MNHN 4	4.3	3.4	6.0	0.9	0.57	3.78
paratype MNHN 5	4.4	3.8	6.0	1.0	0.63	3.80

Table 32. - *Calliotropis ostrideslithos* : Shells measurements in mm for types.

Discussion. *Calliotropis ostrideslithos* n. sp. is rather close to *C. cooperculum* n. sp. (Figs 190-193) but this smaller species has a more elevated spire giving a very different shape to the shell, 6 weaker, low spiral cords on the base and only one spiral cord inside the umbilicus.

Etymology. Mother of pearl (Greek : οστριδης λιθος), used as a noun in apposition - with reference to the nacreous colour of the shell.

Calliotropis nomismasimilis n. sp.

Figs 230-233, Table 33

Type material. Holotype (5.2 x 9.1 mm) MNHN (9896). Paratypes : 3 MNHN (9897).

Type locality. Solomon Islands, SALOMON 1, stn CP1786, 9°21.3'S, 160°24.6'E, 387 m.

Material examined. Solomon Islands. SALOMON 1: stn CP1786, 9°21.3'S, 160°24.6'E, 387 m, 4 dd (holotype and paratypes), 3 dd sub, 3 dd juv. - Stn CP1837, 10°12.8'S, 161°28.6'E, 381-383 m, 2 lv, 2dd, 1 lv sub, 2 lv juv.

Distribution. Solomon Islands, alive in 381-383 m, shells in 383-387 m.

Diagnosis. A hazel beige *Calliotropis* species of small size, with a cyrtoconoidal, depressed spire, an angulated periphery and to 3 granular spiral cords on last whorls, the two abapical cords very close, making a strong keel on last whorl; base with 6 close granular spiral cords; broad umbilicus without spiral cord inside.

Description. *Shell* of small size for the genus (height up to 5.2 mm, width up to 9.1mm),
much broader than high, cyrtoconoidal; spire depressed, height from 0.5x to 0.6x width, 4.1x to 4.7x aperture height; broad umbilicus.
Protoconch of from 280 to 300 µm, of 1 whorl, without terminal varix.
Teleoconch up to 4.8 whorls, first whorls moderately convex and last whorls slightly concave, with 2 spiral granular cords different in size on first whorls and 3 cords on last whorls; primary axial sculpture only visible on first whorls.
Suture deeply canaliculated.
First whorl convex, sculptured by about 20 slightly prosocline smooth ribs; interspace between ribs from 2x to 2.5x broader than ribs; primary cords P1 and P3 appearing almost immediately, granular; nodules from cords produced by intersections with axial ribs; P3 slightly stronger than P1. On second whorl, beads of both cords stronger and sharp, beads of P3 thicker than those of P1; axial ribs weaker. On third whorl, beads of P1 and P3 broader and bluntly sharp; distance between beads about 2x broader than size of beads; P4 emerging partially from suture at mid whorl, lamellose; beads of P4 scaly, smaller and 6x more numerous than nodules of P3; P2 absent; axial ribs disappearing. On fourth whorl, beads of P1 almost vertically oriented; P4 fully emerging from suture; no interspace between P3 and P4; bead of P4 smaller than those of P1, bluntly sharp, scaly. On last whorl, P4 peripheral, making keel; beads of P4 about 3x more numerous than nodules of P3, vertically elongated; two, sometimes three, granular tertiary cords appearing after mid whorl between P1 and P3.
Aperture subquadrangular; outer lip thin, with an submedian angle corresponding to exterior P3 and P4, meeting inner lip with an angle of about 120°.
Columella curved at first third, oblique, with 1 basal tooth, expanding into umbilicus.
Base moderately convex, with an exterior smooth area and 6 close granular spiral cords; distance between cords of half size of cords; most interior cord stronger, bordering umbilicus; rather thick axial ribs, connecting beads of cords.
Umbilicus wide, diameter ca. 30% of shell width, deep, funnel shaped, with rather steep sloping walls, undistinct crowded thin axial ribs and without spiral cord inside.
Colour of teleoconch and protoconch hazel beige.

	TW	H	W	HA	H/W	H/HA
holotype	4.8	5.2	9.1	1.1	0.57	4.73
paratype MNHN 1	4.7	4.9	8.9	1.2	0.55	4.08
paratype MNHN 2	4.7	4.8	8.9	1.1	0.54	4.36
paratype MNHN 3	4.7	4.8	7.9	1.1	0.61	4.36

Table 33. - *Calliotropis nomismasimilis* : Shells measurements in mm for types.

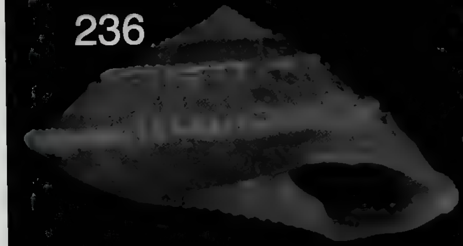
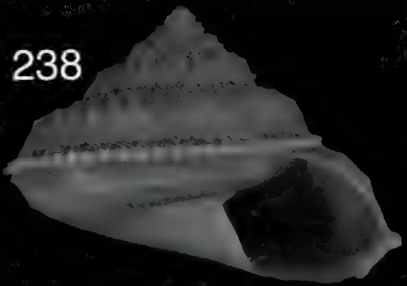
Discussion. The new species is rather close to *Calliotropis nomisma* n. sp. (Figs 236-237) from indonesia, but this species has a spiral cord P3 disappearing on last whorls, no tertiary cords and a very different base that is smooth except a spiral cord around the umbilicus.

See discussion under *C. nomisma* n. sp. for remarks on other close species.

Etymology. Close to nomisma (Latin and Greek) - with reference to closest species *C. nomisma* n. sp.

Figures 236-251. Scale bar = 5 mm.

236-237. *Calliotropis nomisma* n. sp., holotype MNHN (9884), Indonesia, 356-368 m [KARUBAR, stn CP69], 9.7 x 17.6 mm.
238-241. *C. nux* n. sp., Solomon Islands, 570-756 m [SALOMON 1, stn CP1772].
238-239. Holotype MNHN (9873), 11.0 x 14.8 mm; **239-241.** Paratype MNHN, 7.7 x 11.7 mm.
242-245. *C. elephas* n. sp., New Caledonia, 680-700 m [BIOCAL, stn DW51].
242-243. Holotype MNHN (9879), 7.4 x 12.1 mm; **244-245.** Paratype MNHN (9880), 7.7 x 11.4 mm.
246-247. *C. concavospira* (Schepman, 1908), syntype ZMA (3.08.062), Indonesia, 835 m , 6.0 x 8.7 mm.
248-251. *C. denticulus* n. sp., New Caledonia.
248-249. Holotype MNHN (9855), 908 m [BATHUS 3: stn CP844], 7.0 x 9.5 mm; **250-251.** Paratype MNHN (9857), [BATHUS 2/MUSORSTOM], 7.4 x 11.6 mm.

236

238

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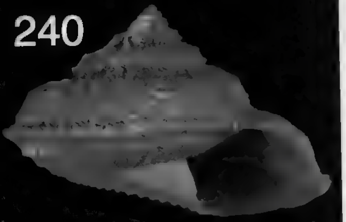
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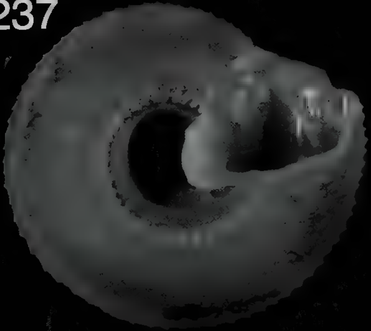
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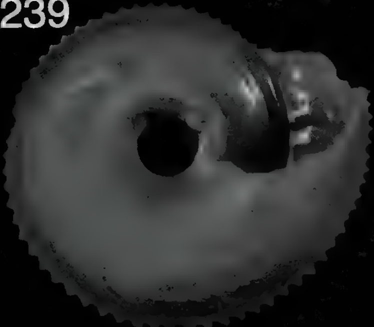
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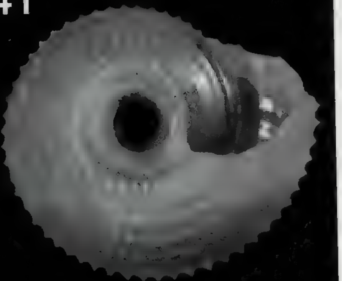
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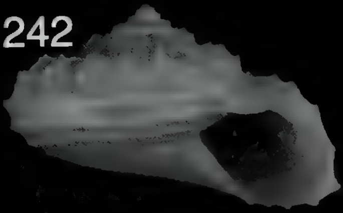
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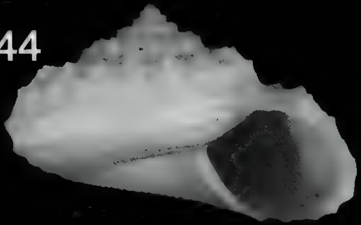
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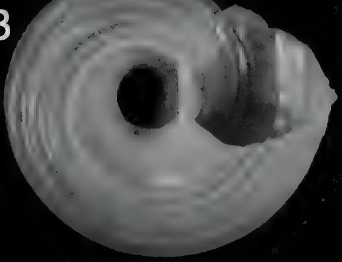
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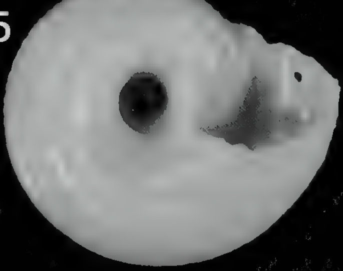
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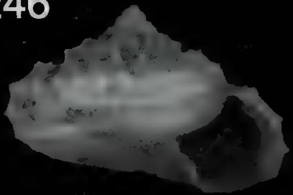
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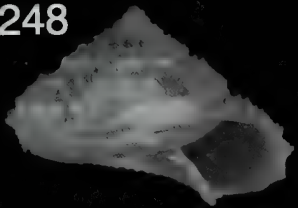
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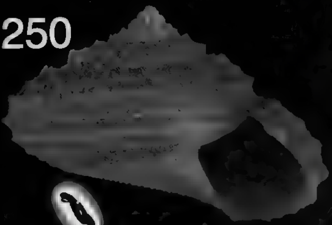
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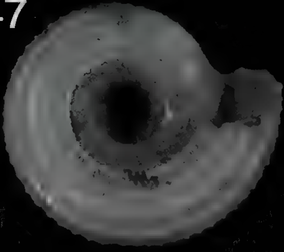
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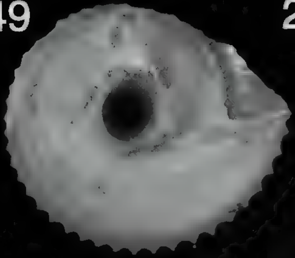
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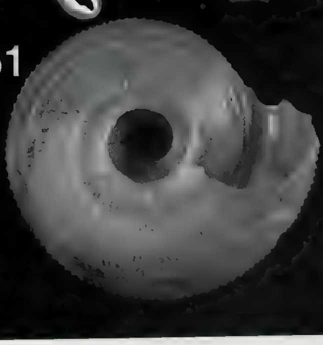

Calliotropis spinulosa (Schepman, 1908)
Figs 234-235

Solariellopsis spinulosa Schepman, 1908: 55-56, pl. IV, fig. 5. Type locality: Indonesia, 0°59.1'S, 129°48.8'E, 411 m.
Other reference :
Calliotropis spinulosa - Vilvens, 2006: fig. 36-37.

Material examined. Indonesia. KARUBAR: stn DW13, 05°26'S, 132°38'E, 417-425 m, 1 dd & 2 dd juv. - Stn DW44, 07°52'S, 132°48'E, 291-295 m, 1 dd juv.

Distribution. Indonesia, 295-417 m (range computed using also data of Schepman, 1908).

Calliotropis pheidole n. sp.
Figs 224-227, Table 34

Type material. Holotype (2.6 x 4.8 mm) MNHN (9898). Paratypes : 4 MNHN (9899).

Type locality. Fiji, BORDAU 1, stn DW1488, 19°01'S, 178°25'W, 500-516 m.

Material examined. Fiji. BORDAU 1: stn DW1488, 19°01'S, 178°25'W, 500-516 m, 5 dd (with holotype and paratypes), 1 dd sub.
Tonga. BORDAU 2: DW1615, 23°03'S, 175°53'W, 482-504 m, 1 dd.

Distribution. South-western Pacific (from Fiji to Tonga), 500-504 m.

Diagnosis. A whitish ochre *Calliotropis* species of small size, with a slightly cyrtoconoidal, depressed spire, an angulated periphery and 2 granular spiral cords on whorls; the abapical cord producing a strong keel and weak additional spiral cords appearing on last whorl; base with 3 flat spiral cords; broad umbilicus with 2 or 3 spiral cords inside.

Description. *Shell* of small size for the genus (height up to 2.7, width up to 5.3 mm), much broader than high, slightly cyrtoconoidal; spire depressed, height 0.5x to 0.6x width, 3.4x to 4.8 x aperture height; broad umbilicus.
Protoconch of from 200 to 250 µm, of 1 whorl, without terminal varix.
Teleoconch up to 4.7 moderately convex whorls with 2 main spiral granular cords different in size; axial sculpture on first whorls, quickly obsolete on next whorls; secondary axial sculpture in abapical area of last whorl.
Suture impressed, weakly canaliculated.
First whorl convex, sculptured by about 20 prosocline smooth, low, poorly marked ribs; interspace between ribs about 1x broader than ribs; primary cord P1 appearing immediately, weak, granular. On second whorl, P1 stronger; interspace between axial ribs 2x broader than ribs. On third whorl, beads of P1 becoming strong nodules, with large interspace between them; P1 making shoulder; axial ribs obsolete, except near nodules; interspace between ribs 3x broader than ribs; P4 emerging from suture at end of whorl, granular; beads of P4 a bit smaller and slightly more numerous than nodules of P1; P2 and P3 absent. On next whorls, weak secondary axial sculpture appearing in abapical part. On last whorl, P4 peripheral, making keel; 2 or 3 weak tertiary spiral cords appearing in area between P1 and P4; one tertiary cord appearing between suture and P1.
Aperture subcircular, inclined backward; outer lip thickened, meeting inner lip without any angle.
Columella slightly curved, oblique, without tooth.
Base almost flat to slightly convex, with 3 low, broad, spiral cords; distance between cords of about 1.5x size of cords; thin ribs may be visible between spiral cords, not connecting beads of cords.
Umbilicus wide, diameter ca. 30% of shell width, deep, funnel shaped, with rather steep sloping walls, with thin, not crowded, axial ribs and with 2, sometimes 3, spiral cords inside.
Colour of protoconch and first whorls of teleoconch ochre; last whorls off white.

	TW	H	W	HA	H/W	H/HA
holotype	4.5	2.6	4.8	0.7	0.54	3.71
paratype MNHN 1	4.7	2.7	5.3	0.7	0.51	3.86
paratype MNHN 2	4.3	2.4	5.0	0.7	0.48	3.43
paratype MNHN 3	4.0	2.2	4.1	0.5	0.54	4.40
paratype MNHN 4	4.3	2.4	4.1	0.5	0.59	4.80

Table 34. - *Calliotropis pheidole* : Shells measurements in mm for types.

Discussion. The new species is close to *Calliotropis vilvensi* Poppe, Tagaro & Dekker, 2006 (Figs 222-223) from the Philippines, but this similar in size species is much more depressed, has a P3 spiral cord peripheral on the last whorl and a spiral cord P4 only visible on this last whorl (instead of an absent P3 and a peripheral P4 for the new species).
Additional material from various Indo-Pacific areas, could prove that intermediate forms exist and that there is only one species with a very large distribution.

Etymology. Thrifty (Greek : φειδωλος) - with reference to low weak cords that appear late.

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Provisional list of Recent *Calliotropis* species of the Indo-Pacific area - release 2007.

Species	distribution
Calliotropis abyssicola Rehder & Ladd, 1973	Central Pacific, 895-1763 m
Calliotropis acherontis Marshall, 1979	South-western Pacific (from eastern Australia to Solomon Islands, New Caledonia and Fiji); south-western Indian Ocean, 500-770 m
Calliotropis annonaformis Lee & Wu, 2001	Pratas Islands, 400-500 m
Calliotropis asphales n. sp.	Solomon Islands, 387-749 m
Calliotropis babylonia Vilvens, 2006	Réunion Island, 1150-1180 m
Calliotropis basileus Vilvens, 2004	Fiji, 560-750 m, and New Caledonia, 830-950 m
Calliotropis bicarinata (Schepman, 1908)	Indonesia, 390 m
Calliotropis blacki Marshall, 1979	South-western Pacific (from New Caledonia to Fiji and Kermadec Is.), 549-720 m
Calliotropis boucheti Poppe, Tagaro & Dekker, 2006	Philippines, 640-770 m and Taiwan, 554 m.
Calliotropis bucina Vilvens, 2006	Réunion Island, 270-310 m; Mayotte Island, 300-350 m; Solomon Islands, 281-513 m; Indonesia, 295-417 m
Calliotropis calcarata (Schepman, 1908)	Indonesia, 180-240 m and Philippines, 150-210 m
Calliotropis canaliculata Jansen, 1994	South-eastern Australia, 841-1700 m
Calliotropis carinata Jansen, 1994	Eastern Australia, 322-1097 m
Calliotropis chalkeie n. sp.	South-western Pacific (from Solomon Is. to New Caledonia and Fiji), 707-1360 m
Calliotropis chenoderma Barnard, 1963	South Africa, 86-228 m
Calliotropis chuni (von Martens, 1904)	Indonesia, 660 m
Calliotropis concavospira (Schepman, 1908)	Indonesia, 835-883 m
Calliotropis conoeides n. sp.	Solomon Islands, 1203-1327 m
Calliotropis cooperculum n. sp.	Fiji, 516-785 m
Calliotropis coopertorium n. sp.	South-western Pacific (from Vanuatu to Fiji), shells in 210-497 m.
Calliotropis crystalophora Marshall, 1979	South-western Pacific (from New Caledonia to Tonga), 495-920 m
Calliotropis cycloeides n. sp.	South-western Pacific (from Solomon Islands to Fiji), 371-403 m
Calliotropis cynee n. sp.	Indonesia, Tanimbar Islands, 891-1244 m
Calliotropis delli Marshall, 1979	South-western Pacific (from Chesterfield to Tonga), 350-490 m
Calliotropis denticulus n. sp.	New Caledonia, 500-2160 m
Calliotropis derbiosa Vilvens, 2004	South-western Pacific (from New Caledonia to Fiji), 800-1230 m
Calliotropis dicrous n. sp.	Solomon Islands, 461-749 m
Calliotropis echidna Jansen, 1994	Eastern Australia and New Caledonia, 115-296 m
Calliotropis echidnoides n. sp.	South-western Pacific (from New Caledonia to Tonga), 248-344 m
Calliotropis elephas n. sp.	New Caledonia, 405-2040 m
Calliotropis ericius Vilvens, 2006	Mayotte Is., 1300-1480 m and Réunion Is., 1600 m

Calliotropis eucheloides Marshall, 1979	South-western Pacific (from Solomon Islands to Tonga), 276-510 m; Philippines, 150-300 m; Indonesia, 240-278 m; western Indian Ocean, 450 m
Calliotropis excelsior Vilvens, 2004	Fiji, 959-963 m and New Caledonia, 1000-1120 m
Calliotropis francocacii Poppe, Tagaro & Dekker, 2006	Philippines, 642-669 m
Calliotropis galea (Habe, 1953)	Japan, 100-200m
Calliotropis gemmulosa (A.Adams, 1860)	Japan and Philippines, 150-192 m
Calliotropis glypta (Watson, 1879)	South-western Pacific (from eastern Australia to Fiji), 660-835 m
Calliotropis granolirata (Sowerby, 1903)	South Africa, 457-1152 m
Calliotropis grata Thiele, 1925	East Africa, 693 m
Calliotropis hataii Rehder & Ladd, 1973	Central Pacific, 1617-1719 m; south-western Pacific, 1058-1280 m; south-western Indian Ocean, 3716 m
Calliotropis helix n. sp.	Taiwan, South China Sea, 790-904 m
Calliotropis hondoensis (Dall, 1919)	Japan, 1655 m
Calliotropis hysterea n. sp.	South-western Pacific (from Chesterfield to New Caledonia), 980-1080 m.
Calliotropis infundibulum (Watson, 1879)	Western Atlantic, 230-3259 m; Indian-Atlantic Ridge, 1965-2514 m; South Africa, 2750 m; Japan, 2000-2150 m; south-western Pacific, 2040-2315 m; New Zealand, 2080-2515 m
Calliotropis keras n. sp.	South-western Pacific, 600-650 m
Calliotropis lamellifera Jansen, 1994	Eastern Australia, 322-1330 m and New Caledonia area, 470-2040 m
Calliotropis limbifera (Schepman, 1908)	Indonesia, 522 m and south-western Pacific, 315-415 m
Calliotropis malapascuensis Poppe, Tagaro & Dekker, 2006	Philippines, 50-150 m
Calliotropis metallica (Wood-Mason & Alcock, 1891)	South Africa (Cape), 1024-2743 m, north-western Madagascar, 850-1125 m, East Africa (Aden), 1840 m, and central Indonesia, 918-2029 m.
Calliotropis micraulax Vilvens, 2004	South-western Pacific (from Chesterfield to Vanuatu), 780-1280 m.
Calliotropis midwayensis (Lan, 1990)	Midway Islands, 600 m and Taiwan, 876-904 m.
Calliotropis minorusaitoi Poppe, Tagaro & Dekker, 2006	Philippines, 2800 m
Calliotropis multisquamosa (Schepman, 1908)	Indonesia, 522 m and New Caledonia, 282-305 m
Calliotropis muricata (Schepman, 1908)	Indonesia, 390 m
Calliotropis niasensis Thiele, 1925	Indonesia, 132 m
Calliotropis nomisma n. sp.	Indonesia, 368-399 m
Calliotropis nomismasimilis n. sp.	Solomon Islands, 383-387 m
Calliotropis nux n. sp.	Solomon Islands, 575-624 m
Calliotropis oregmene n. sp.	Fiji, 707-820 m
Calliotropis oros n. sp.	South-western Pacific (from New Caledonia to Fiji), 443-591 m.
Calliotropis oros marquisensis n. ssp.	Marquesas Islands, 408-1150 m
Calliotropis ostrideslithos n. sp.	Solomon Islands, 542-749 m.
Calliotropis ottoi (Philippi, 1844)	Indonesia, 150-914 m
Calliotropis pagodiformis (Schepman, 1908)	Indonesia, 835-918 m and Solomon Islands, 461-749 m
Calliotropis patula (von Martens, 1904)	East Africa, 977-1019 m
Calliotropis persculpta (Sowerby, 1903)	South Africa, 804 m
Calliotropis pheidole n. sp.	South-western Pacific (from Fiji to Tonga), 500-504 m

Calliotropis philippei Poppe, Tagaro & Dekker, 2006	Philippines, 550-884 m
Calliotropis pistis n. sp.	New Caledonia area, 715-780 m.
Calliotropis pompe Barnard, 1963	Off Cape Point, 2706-3255 m
Calliotropis powelli Marshall, 1979	Kermadec Is., 256-402 m
Calliotropis ptykte n. sp.	Tonga, 500 m
Calliotropis pulchra (Schepman, 1908)	Indonesia, 275-397 m
Calliotropis pulvinaris Vilvens, 2005	Western Madagascar, 550-800 m
Calliotropis pyramoeides n. sp.	South-western Pacific (New Caledonia area), 250-350 m.
Calliotropis reticulina (Dall, 1895)	Japan and Hawai, "deep water"
Calliotropis rostrum n. sp.	South-western Pacific (New Caledonia and Coral Sea), 658-780 m.
Calliotropis sagarinoi Poppe, Tagaro & Dekker, 2006	Philippines, 164-176 m
Calliotropis scalaris Lee & Wu, 2001	South China Sea, 400-500 m; eastern Indonesia, 480-603 m; New Caledonia, 620-713 m.
Calliotropis siphaios n. sp.	South-western Pacific (from Fiji to Tonga), 450-500 m
Calliotropis solariellaformis Vilvens, 2006	Réunion Island, 1150-1180 m
Calliotropis solomonensis n. sp.	Solomon Islands, 263-396 m
Calliotropis spinosa Poppe, Tagaro & Dekker, 2006	Philippines, 842-865 m
Calliotropis spinulosa (Schepman, 1908)	Indonesia, 295-417 m
Calliotropis stanyii Poppe, Tagaro & Dekker, 2006	Philippines, 242-760 m and Solomon Islands, 513-564 m
Calliotropis stegos n. sp.	Solomon Islands, 451-749 m
Calliotropis stellaris Lee & Wu, 2001	Philippines, 300-400 m
Calliotropis trieres n. sp.	New Caledonia, 400 m.
Calliotropis velata Vilvens, 2006	Western Madagascar, 550-800 m
Calliotropis vilvensi Poppe, Tagaro & Dekker, 2006	Philippines, 470-566 m; Indonesia, 680-700 m; south-western Pacific (from Solomon Islands to New Caledonia), 391-680 m.
Calliotropis virginiae Poppe, Tagaro & Dekker, 2006	Philippines, 93-330 m
Calliotropis wilsi Poppe, Tagaro & Dekker, 2006	Philippines, 609-673 m
Calliotropis yukikoae Poppe, Tagaro & Dekker, 2006	Philippines, 255-647 m
Calliotropis zone n. sp.	South-western Pacific (from New Caledonia to Fiji), shells in 305-403 m;; Taiwan, 246 m.

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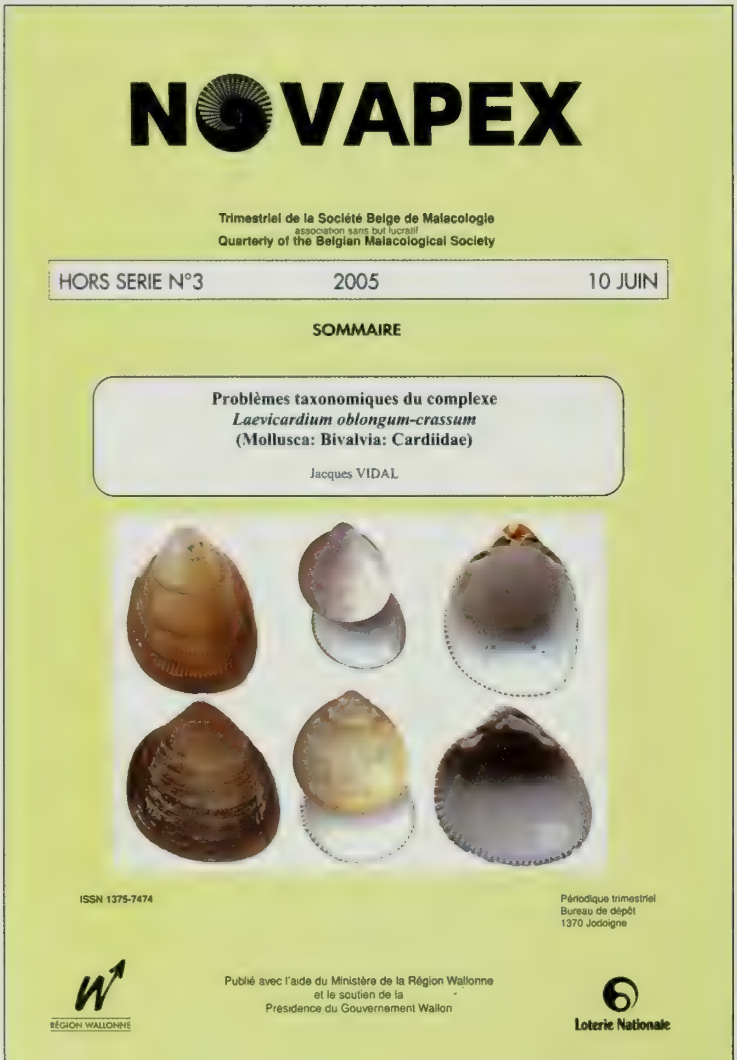

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